CLERK'S COPY.

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1928

No. 752

HENRY FORD & SON, INC., PETITIONER,

vs.

LITTLE FALLS FIBRE COMPANY, ASBESTOS SPINNING AND WEAVING CORPORATION, AND HARRY A. FURMAN ET AL., ETC.

ON WRIT OF CERTIORARI TO THE SUPREME COURT OF THE STATE OF NEW YORK

PETITION FOR CERTIORARI FILED MARCH 7, 1929

CERTIORARI GRANTED APRIL 15, 1929

(34,061)

(34,061)

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1928

No. 752

HENRY FORD & SON, INC., PETITIONER,

vs.

LITTLE FALLS FIBRE COMPANY, ASBESTOS SPINNING AND WEAVING CORPORATION, AND HARRY A. FURMAN ET AL., ETC.

ON WRIT OF CERTIORARI TO THE SUPREME COURT OF THE STATE OF NEW YORK

INDEX.

	Original	Print
Record on appeal to court of appeals of New York	15	1
Statement under rule 234	15	1
Notice of appeal to appellate division	16	2
Summons	17	2
Complaint	18	3
Answer	23	6
Opinion, Heffernan, J	28	9
Decision	39	17
Defendant's requests to find	46	22
Notice of exceptions	59	32
Stipulation as to damages	63	35
Judgment	65	36
Notice of appeal to appellate division	69	39
Notice of motion for additional allowance	70	39
Affidavit of Thomas O'Connor	71	40

JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., MAY 1, 1929

	Original	Print
Affidavits of Charles J. Weaver	75	43
Opinion, Heffernan, J., on order for extra allowance	80	46
Order granting extra allowance	82	48
Case	84	49
Appearances of counsel	84	49
Testimony of Charles J. Weaver	84	49
Roger Wiseman	144	102
Harry R. Perkins	156	113
Edward Burr	160	117
Edward H. Sargent	201	152
Dana M. Wood	205	156
Charles J. Weaver (recalled)	283	226
Plaintiffs' Exhibit 1—Stipulation as to facts	286	228
Plaintiffs' Exhibit 17—Letter from Ford & Son to U. S. Engineer Office, September 22, 1924	295	234
Plaintiffs' Exhibit 18—Letter from U. S. Engineer Office to Ford Motor Co., January 12, 1925	295	235
Defendant's Exhibit 10—Certified copy of water power license project No. 13, with acceptance thereof	296	235
Defendant's Exhibit 11—Regulations to govern pool level and maintenance of flashboards	307	244
Stipulation settling case	309	245
Order settling case	310	246
Stipulation waiving certification	310	246
Order modifying order appealed from, appellate division	312	247
Judgment, appellate division	314	248
Notice of appeal to court of appeals	317	250
Opinion, Hill, J., appellate division	319	251
Stipulation waiving certification, court of appeals	325	255
Remittitur, court of appeals	326	258
Order on remittitur	329	260
Judgment	331	261
Opinion, Pound, J., court of appeals	334	262
Concurring opinion, Crane, J	340	267
Concurring opinion, Cardozo, J	340	268
Concurring opinion, Andrews, J	341	268
Clerk's certificate	346	271
Order allowing certiorari	347	273

IN SUPREME COURT OF NEW YORK, APPELLATE DIVISION, THIRD DEPARTMENT

LITTLE FALLS FIBRE COMPANY, ASBESTOS SPINNING AND Weaving Corporation, and Harry A. Furman, Charles H. Burrows, and Clarence T. Wright as Receivers of Mohawk Paper Makers, Inc., Respondents-Appellants,

against

HENRY FORD & SON, INC., Appellant-Respondent

STATEMENT UNDER RULE 234

1925.

July 17. Summons and Complaint served.
July 23. Answer served.
December 29. Temporary injunction order entered.

1926.

June 10-11. Trial before Heffernan, J.
September 28. Decision filed.

1927.

March 7. Stipulation as to damages filed.

[fol. 16]

March 10. Notice of Motion for extra allowance served.
May 31. Order granting plaintiff extra allowance entered.
June 10. Appeal therefrom by plaintiffs.
June 10. Judgment entered.
June 17. Appeal therefrom by defendant.

The original parties are named in full as above, except that, in place of Mohawk Paper Makers, Inc., Harry A. Furman and Henry W. Brooks, Jr., as receivers thereof, were substituted as plaintiffs by order entered June 12, 1926; and except that Charles H. Burrows and Clarence T. Wright as receivers thereof were substituted as plaintiffs in place of said Henry W. Brooks, Jr., by order entered June 6, 1927.

In Supreme Court of New York, Saratoga County

Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation, and Harry A. Furman, Charles H. Burrows, and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc., Plaintiffs,

against

Henry Ford & Son, Inc., Defendant

Notice of Appeal from Judgment

To the Clerk of the County of Saragtoga and Thomas O'Connor, attorney for plaintiffs:

[fol. 17] Sirs: Take notice, that the above-named defendant Henry Ford & Son, Inc., hereby appeals to the Appellate Division of the Supreme Court in and for the Third Judicial Department of the State of New York from each and every part of the judgment in this action entered June 10, 1927, in the office of the clerk of the County of Saratoga.

Dated June 13, 1927.

Yours, etc., Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

Office and Post Office address: 126 State Street, Albany, New York.

In Supreme Court of New York

Plaintiff designates as the place of Trial, the County of Saratoga.

[Title omitted]

Summons

To the above-named defendant:

You are hereby summoned to answer the complaint in this action, and to serve a copy of your answer, or, if the [fol. 18] complaint is not served with this summons, to serve a notice of appearance, on the plaintiff's attorney within twenty days after the service of this summons, ex-

clusive of the day of service. In case of your failure to appear or answer, judgment will be taken against you by default for the relief demanded in the complaint.

Dated this 3rd day of July, 1925.

Thos. O'Connor, Plaintiff's Attorney.

Office and Post Office address: Waterford, Saratoga County, New York.

In Supreme Court of New York

[Title omitted]

Complaint

Plaintiffs complain of the above-named defendant and allege:

First. That the plaintiff Little Falls Fibre Company is a corporation duly organized and existing under the Laws [fol. 19] of the State of New York and having a place of business in the town of Waterford, Saratoga County, New York.

Second. That the plaintiff Asbestos Spinning and Weaving Corporation, is a corporation duly organized under the Laws of the State of New York and having a place of business in the said town of Waterford, Saratoga County, New York.

Third. That the plaintiff Mohawk Paper Makers, Inc., is is a corporation duly organized and existing under the Laws of the State of New York and having its principal place of business in the said town of Waterford, Saratoga County, New York.

Fourth. On information and belief that the defendant is a corporation duly organized and existing under the Laws of the State of New York and having its principal place of business in the Borough of Manhattan, City, County and State of New York.

Fifth. That the plaintiffs are the owners and in possession of certain land, riparian and water rights, and water power rights in, on, under and along the Mohawk river in

the town of Waterford, Saratoga County, N. Y., which constitute a site for the development of water power.

Sixth. That at said site for about one hundred years last past the plaintiffs and their predecessors in title have jointly owned, maintained and operated a dam across said Mohawk river and a power canal leading from the pool formed by said dam for the purpose of developing and utilizing their said water power and have for said period and down to the present date utilized said water power.

Seventh. That the plaintiffs are now jointly maintaining [fol. 20] and operating said dam and power canal and severally developing and utilizing said water power by means of hydraulic works upon parcels of land severally owned and possessed by them upon which are also located mills and factories severally owned and possessed by the plaintiffs and operated by means of said water power.

Eighth. That in or about the year 1922 the defendant constructed in, and upon the bank of, the Hudson river in the village of Green Island, Albany County, New York, and a short distance down stream from the confluence of the Mohawk and Hudson rivers an hydro-electric power plant for the development of water power and the conversion of the same into electrical energy; that said defendant has ever since, and now is, operating said power plant and that the water used for such purpose is drawn from the pool formed by a concrete dam erected in or about the year 1915 by the United States of America across the Hudson river between the City of Troy, Rensselaer County, New York, and said village of Green Island.

Ninth. On information and belief that on or about the 16th and 17th days of June, 1925, the defendant for the purpose of aiding and improving the operation of its said water power plant and of increasing the power which it could procure therefrom, erected, or caused to be erected, upon the crest of said dam in the Hudson river barriers or boards, known as flashboards, to a height of upwards of two feet, whereby the height of said dam and the elevation of the water impounded thereby has been raised upwards of two feet.

Tenth. That the placing of said flashboards on said dam by the defendant has raised the elevation of the waters of [fol. 21] the Hudson and Mohawk rivers upwards of two feet upon the aforesaid real property of these plaintiffs and upon the aforesaid water power possessed and being utilized by them and has caused serious damage to said real property and said water power of these plaintiffs; that such raising of the elevation of the waters of the Mohawk river, caused by the acts of the defendant, has deprived these plaintiffs of the use of a part of their said water power and has reduced the head available by upwards of two feet; that it has interfered with the operation of their hydraulic apparatus and reduced the amount of power available therefrom, and has interfered with the operation of the aforesaid mills and factories of these plaintiffs.

Eleventh. On information and belief that the defendant purposes and intends to continue the maintenance of said flashboards and the raising of the elevation of the water upon the said real property and the water power of the plaintiffs and thereby to continue to cause to the plaintiffs and to their property and water power serious damage as aforesaid and has refused to remove said flashboards.

Twelfth. That the aforesaid acts of the defendant have already caused great and irreparable damage to these plaintiffs and are now causing and will continue to cause such great and irreparable damage and that the plaintiffs have no adequate remedy at law.

Wherefore, plaintiffs demand judgment that the defendant be adjudged forthwith to remove said flashboards and any other obstructions from the crest of said dam in the Hudson river and that it be enjoined from maintaining them or any other obstructions on said dam whereby the height thereof and the elevation of the water thereby impounded is, or will be, in any manner, raised, and from [fol. 22] doing any other act or thing which will cause the raising of the elevation of the water upon the land, buildings, and water power of the plaintiffs, and that, in addition thereto, that each of the plaintiffs have judgment against the defendant for the damages already sustained,

and which may hereafter be sustained, by it as the result of the erection and maintenance of said flashboards, and that the plaintiffs have such further and other relief as may be just and proper, including the costs of this action.

Thos. O'Connor, Attorney for Plaintiffs.

Office and Post Office address: Waterford, Saratoga County, N. Y.

Duly sworn to by Maurice J. Stack. Jurat omitted in printing.

[fol. 23] IN SUPREME COURT OF NEW YORK

[Title omitted]

ANSWER

The above-named defendant, for its answer to the complaint herein:

1. Denies any knowledge or information sufficient to form a belief as to whether plaintiffs are the owners of the land, riparian and water rights and water power rights specified in paragraph "Fifth" of said complaint.

2. Denies any knowledge or information sufficient to form a belief as to any of the allegations contained in either of the paragraphs numbered and designated, respectively, "Sixth" and "Seventh" in said complaint.

3. Denies that the flashboards mentioned in paragraph "Ninth" of said complaint were erected to a height of upwards of two feet above the crest of the dam mentioned in said paragraph "Ninth" of said complaint, and denies that the elevation of the water impounded thereby has been raised upwards of two feet.

[fol. 24] 4. Denies upon information and belief each and every allegation contained in the paragraphs numbered and designated, respectively, as "Tenth," "Eleventh" and "Twelfth" in said complaint, except that defendant does not deny that it purposes and intends to continue the maintenance of said flashboards at not more than two feet above the crest of said dam.

5. For a first defense to the alleged cause of action set forth in said complaint, alleges:

(a) On or about the 3rd day of March, 1921, defendant, which then was, ever since has been and now is, a corporation empowered to utilize water power, and authorized to transact in the State of New York all business necessary to effect the purposes of a license under the Federal Water Power Act, being the Act of Congress entitled "An Act to create a Federal Power Commission; to provide for the improvement of navigation; the development of water power; the use of the public lands in relation thereto, and to repeal section 18 of the River and Harbor Appropriation Act, approved August 8, 1917, and for other purposes," approved June 10, 1920, duly obtained from the Federal Power Commission its water power license whereby defendant was authorized by the Federal Power Commission to construct, maintain and operate the power plant mentioned in the complaint herein, which power plant is known and designated by the Federal Power Commission as Project No. 13, which project was duly found and determined by the Federal Power Commission to be desirable and justified in the public interest for the purpose of improving and developing the Hudson river for the use and benefit of interstate and foreign commerce.

[fol. 25] (b) The dam mentioned in paragraph "Eighth" of said complaint is commonly known as the Troy Dam, and consists of two spillways of which the more easterly is known as the main spillway and the more westerly is known as the auxiliary spillway. The height of the crest of said main spillway, as constructed by the Government of the United States, is 14.33 feet above mean sea level, while the height of the crest of said auxiliary spillway, as constructed by the Government of the United States, is 16.33 feet above mean sea level. The height of the flashboards of which plaintiff complains, and which defendant has erected solely on said main spillway, is but two feet, so that the top of said flashboards is but 16.33 feet above mean sea level, which is the same height as the height of the crest of said auxiliary spillway.

(c) Said flashboards were so erected and are maintained by defendant pursuant to regulations of the Federal Power

Commission, approved by the Secretary of War, December 2nd, 1924, whereby it is prescribed that defendant may maintain said flashboards on said main spillway to a height of 16.33 feet above mean sea level, a height equal to the height of said auxiliary spillway. The Federal Water Power Act, said water power license so issued by the Federal Power Commission to this defendant, and said regulations so approved by the Secretary of War constitute and afford the title, right, privilege and immunity which this defendant hereby sets up and claims, to erect and maintain said flashboards upon said main spillway at a height not exceeding 16.33 feet above mean sea level. The Hudson river and the Mohawk river, at all of the times mentioned in the complaint herein, were and now are navigable waters, at the several places specified in said complaint.

[fol. 26] 6. For a second defense to the alleged cause of action set forth in said complaint, repeats the allegations contained in the first defense hereof and further alleges:

In erecting and maintaining the flashboards specified in said complaint defendant at all times has been and now is acting for and as an agency of the government of the United States which, in the exercise of the power of Congress to regulate commerce with foreign nations and among the several States, as granted by clause 3 of section 8 of Article I of the Constitution of the United States, has authorized and approved the maintenance and erection of said flashboards for the benefit of interstate and foreign commerce.

7. For a third defense to the alleged cause of action set forth in said complaint, repeats the allegations respectively contained in the first and second defenses hereunder and further alleges:

In the erection and maintenance of said flashboards, defendant has proceeded skilfully in the exercise of reasonable care and with due regard for the rights of others, including each of the plaintiffs herein.

8. For a fourth defense to the alleged cause of action set forth in said complaint, alleges, upon information and belief, that for the alleged injuries and damages of which plaintiffs complain in their said complaint, each of the plaintiffs has an adequate remedy at law and neither of them is entitled to the equitable interference of this court.

[fol. 27] Wherefore defendant demands judgment that said complaint be dismissed upon the merits, with costs.

Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

Office and Post Office address: 126 State Street, Albany, New York.

Duly sworn to by B. J. Craig. Jurat omitted in printing.

[fol. 28] In Supreme Court of New York

[Title omitted]

Opinion on Judgment (127 Misc., 834)

Thos. O'Connor (George E. O'Connor of counsel), for plaintiffs.

Whalen, Murphy, McNamee & Creble (Robert E. Whalen [fol. 29] and Charles E. Nichols, Jr., of counsel) for defendant.

Heffernan, J.:

This is a suit in equity for a permanent injunction restraining the defendant from maintaining flashboards on the Federal dam in the Hudson river at Troy, for the removal of such flashboards and for the recovery of money damages claimed to have been sustained by the plaintiffs by reason of their erection and maintenance.

The plaintiffs are manufacturing corporations and are the owners and in possession of certain land, riparian and water rights, and water power rights, in, on, under and along the northernmost branch of the Mohawk river west of its confluence with the Hudson river in the town of Waterford, Saratoga county, New York, which constitute a site for the development of water power usually known as Kings Canal Development. The Mohawk and Hudson rivers are navigable streams at all points involved in this controversy. About the year 1828 the respective predecessors in title of the plaintiffs constructed at the point indicated a dam for the development of water power, and

in connection therewith and hydraulic canal along the bank of the river. Between the canal and the river they erected mills. For practically a century the plaintiffs and their predecessors have continuously and jointly owned, possessed, used, occupied and maintained the dam and canal for the purpose of developing and utilizing the water power by means of hydraulic works upon parcels of land severally owned by them for the operation of machinery in their factories.

At Troy, at a point about three miles down stream from the plaintiffs' plants, the State of New York constructed, about the year 1823, a dam across the Hudson river with [fol. 30] a crest elevation of 13.23 Barge Canal Datum (abbreviated B. C. D.). This is the datum customarily used by the State of New York in the vicinity of the premises involved. This datum is 0.87′ below the datum known as mean sea level at Sandy Hook, which latter datum is used by the United States engineers in the same vicinity. The old State dam had a lock in its easterly end for the passage of boats which went up the Hudson, turned into the north branch of the Mohawk river and thence into the locks which elevated the boats to the old Champlain canal. These old locks were located immediately north of the present lock No. 2 Erie canal. Prior to 1915, and in the course of the Barge canal construction, a new lock known as lock No. 2 Erie canal was erected at Waterford.

In 1915 the United States of America constructed a dam across the Hudson river between Troy and Green Island, replacing the old State dam which had theretofore existed in the river near the same location. This is commonly known as the Troy dam, is situated about fifteen thousand feet below the plaintiffs' plants, and consists of two spillways, the more easterly being known as the main spillway and the more westerly being known as the auxiliary spillway. The crest of the easterly spillway is approximately 586 feet long and its elevation is 15.2 B. C. D. The crest of the westerly spillway is approximately 669 feet long and its elevation is 17.2 B. C. D. The construction of the Federal dam was authorized by Act of Congress entitled: "An Act Making Appropriations for the Construction, Repair and Preservation of Certain Public Works on Rivers and Harbors and for Other Purposes," approved June 25, 1910.

A further appropriation for the construction of the dam was made by the Act of Congress, similarly entitled, ap-[fol. 31] proved March 4, 1913. When the government built the dam it provided on the main spillway concrete holes for the installation of flashboards. The Federal dam was also provided with a lock in its easterly end and backed the water up to lock No. 2 Erie canal so that boats could pass through the lock at Troy, thence up the Hudson and into the north branch of the Mohawk and thence through lock No. 2 westerly to Buffalo. From 1915, when the lock and dam were put into operation, until June, 1925, no flashboards were used.

In 1921 the defendant procured a license from the Federal Water Power Commission, a body consisting of the Secretary of War, the Secretary of the Interior and the Secretary of Agriculture and established by the Federal Water Power Act, for the construction, maintenance and operation of an hydro-electric power plant at the Green Island end of the Federal dam for the development of water power and the conversion of the same into electrical energy. In its application the defendant stated that flashboards two feet in height would be used on the main spillway section of the dam, ultilizing the holes provided for that purpose in the spillway crest, but that no flashboards would be used on the auxiliary spillway section. The license issued to the defendant authorized the construction, maintenance and operation of the power plant and this project, known and designated by the Commission as Project No. 13, was determined by that body as prescribed in section 4 (d) of the Federal Water Power Act to be "desirable and justified in the public interest for the purpose of improving and developing the Hudson river for the use and benefit of interstate or foreign commerce." At the time its application was filed for this license, the defendant was and is now empowered to utilize water power, and authorized to trans-[fol. 32] act in this State all business necessary in effecting the purpose of a license under the Federal Water Power Act. In its application the defendant said "so far as navigation is concerned the effect of the power plant will be virtually negligible." The defendant's license was granted and accepted subject to all the terms and conditions of the Federal Water Power Act of June 10, 1920. The provi-

sions of that Act are expressly and in terms made part of the license. This Act, in section 10, subd. (c), provides:

"Each licensee hereunder shall be liable for all damages "occasioned to the property of others by the construction, "maintenance, or operation of the project works or of the "works appurtenant or accessory thereto, constructed under "the license, and in no event shall the United States be "liable therefor."

Section 27 of the same Act reads:

"That nothing herein contained shall be construed as "affecting or intending to affect or in any way to interfere "with the laws of the respective States relating to the con- "trol, appropriation, use, or distribution of water used in "irrigation or for municipal or other uses, or any vested "right acquired therein."

In 1922, in accordance with the permission granted by the Federal Water Commission, the defendant constructed its hydro-electric power plant on the Hudson river about fifteen hundred feet below the plaintiffs' plants, and since that time has operated the same by means of water drawn from the pool formed by the Federal dam. The defendant is not a public service corporation but delivers the power developed by it to the manufacturing plant of Ford Motor Company at Green Island where it is utilized for private [fol. 33] manufacturing purposes.

On September 22, 1924, the defendant requested permission from the War Department "to install flashboards on the Troy dam in connection with the operation of our power house." On January 12, 1925, the War Department granted such permission subject to certain regulations approved by the Secretary of War. These regulations provide for the maintenance of flash-boards on the easterly spillway of the dam to a height of 17.2 B. C. D., which is the same as the height of the crest on the auxiliary spillway of such dam.

About June 16, 1925, the defendant installed flash-boards consisting of two 12″ planks, 2 feet in height upon the main spillway of the dam. The purpose of the defendant in so installing the flashboards was to aid and improve the opera-

tion of its water power plant and to increase the power which it could procure therefrom.

The pool of the Federal dam at Troy extends to the tailraces of the hydraulic plants of the plaintiffs so that the elevation of the water at the dam is controlling upon the elevation of the water in the tailraces of plaintiffs' equipment. The maintenance of these flashboards on the dam increases the elevation of the water there with a consequent increase at the tailraces of the plaintiffs' plants. Since the elevation of the water at plaintiffs' tailraces in controlled by the elevation of the water at the Troy dam and since any increase in the elevation of such water causes a corresponding increase in the elevation of the water at plaintiffs' tailraces, it necessarily follows that any raise in the water at Troy reduces the head on plaintiffs' hydraulic equipment correspondingly with a proportionate reduction in the [fol. 34] power available therefrom. So long as flashboards are maintained on the dam there is a continuous loss of power to plaintiffs from their hydraulic plants and also a backing of water upon their lands, building and equipment. By reason of the erection of the flashboards on the dam, defendant has procured for its own use two feet of additional head and as a natural result a large amount of additional power. The defendant concedes that the presence of these flashboards on the dam will cause to plaintiffs' plants, during 65% of the time, an average loss of head of 0.04'. The plaintiffs are dependent upon this water power for the operation of their machinery, and the direct result of the flashboards is to seriously reduce the power available to them. In the last analysis, by its ingenious procedure, the defendant has taken two feet of head from the plaintiffs and has appropriated it to its own use. Certainly this is an invasion of the vested rights of the plaintiffs.

As complete justification for its acts, the defendant asserts two Federal defenses:

1. The title, right, privilege and immunity, set up and claimed by defendant, to erect and maintain the flashboards under the Federal Water Power Act, and a water power license issued by the Federal Power Commission to defendant, as supplemented by regulations of the Federal Power Commission approved by the Secretary of War;

2. Defendant's agency for the Government of the United States in erecting and maintaining the flashboards for the benefit of interstate and foreign commerce, under the commerce clause of section 8 of Article I of the Constitution of the United States.

The defenses interposed present only questions of law. The defendant disputes liability upon the grounds, in sub- [fol. 35] stance, that it has a license from the Federal Government to do the acts complained of, and that in so doing, it is acting as a governmental agency. If either or both of these defenses are sufficient, then the plaintiffs can establish at most a case of damnum absque injuria.

These plaintiffs, as riparian owners, have an absolute right to have the waters at their properties continued in their natural condition free from any interference or obstruction (Pixley v. Clark, 35 N. Y., 520; Hall v. Augsbury, 46 N. Y., 622; United P. & B. Co. v. Iroquois P. & P. Co., 226 N. Y., 38). In the latter case, speaking of these rights, the court said:

"The rule of law is familiar that each owner of land con- "tiguous to a natural watercourse has a right, as owner of "such land and as naturally connected with and incident to "it, to the natural flow of the stream along his land and its "descent, and all the force to be derived therefrom, for any "domestic or hydraulic purpose to which he may decide to "apply it. He may, by means of a ditch or conduit, with- "draw water from the stream and cause it to flow un- "naturally through his land for agricultural, industrial or "other purpose, provided he causes it, in its substantial "volume, to return upon his land to the stream. In order "that he may enjoy those rights every owner is bound to "use the water reasonably as it flows, so as not to injure "the equal rights of all the owners. Whether or not a use "or detention of the water is reasonable must be determined "by the extent and capacity of the stream, the uses to which "it is and has been put, and the rights that other owners on "the stream have. The essential question in each particu- [fol. 36] "lar case is what is reasonable under the condi- "tions and circumstances there presented. Those are "riparian rights, are natural and inherent, and a part of "the estate of each riparian owner."

The rights of the plaintiffs, as riparian owners, are subordinate only to the servitude of the public for the purpose of navigation and commerce and to the governmental right of eminent domain within constitutional limitations. In the case of navigable streams, Congress has paramount authority to control navigation for the purpose of regulating commerce among the several States and foreign nations (Shively v. Bowlby, 152 U. S. 1, 40, 58; Gibson v. United States, 166 U. S., 269, 272; Scott v. Lattig, 227 U. S., 229, 243). It is not open to dispute that the Federal or State government may remove, or compel the removal of, structures erected in navigable streams.

The Fifth Amendment to the Constitution of the United States provides:

"Nor shall private property be taken for public use, "without just compensation."

The improvement of navigation is a public use. The power of Congress to regulate commerce is subject to the inhibition of this amendment against the taking of private property for public use without compensation. When that power is exercised and private property is taken, it must be done in subordination of this provision (Monongahela Navigation Company v. United States, 148 U. S., 312, 336; United States v. Lynah, 188 U. S., 445, 465, 471; United States v. Cress, 243 U. S., 316). The government could take the lands of these plaintiffs and divert from their water power properties the water power which operated them, but only upon making just compensation. The right [fol. 37] of the Federal government to make improvement in navigable streams in facilitating navigation and in the interest of interstate and foreign commerce must be conceded. Where, however, under the plea of improvement of navigation property rights of a riparian owner are diminished by the diversion of the waters, a clear case is presented for the enforcement of the constitutional guaranty of compensation. The defendant contends that the damage of which the plaintiffs complain is the incidental consequence of a lawful and proper exercise of a governmental power and is merely incidental to the exercise of the servitude to which their property has always been subject, and that there is no taking of property within the meaning of

the constitutional provision, and that consequently they have no right to compensation. To that doctrine I am not willing to subscribe. Neither the State nor the Nation can intrude upon or invade a riparian owner's rights without subjecting itself to liability. The Federal government could not lawfully take plaintiffs' properties without making compensation. Obviously, it could not authorize the defendant to commit a trespass upon plaintiffs' rights. What the government cannot do directly, it may not do indirectly. To destroy property is to appropriate it. The destruction of the water rights of the plaintiffs at the level long existing is an appropriation of such property and neither the State nor the Nation can exclude the owners from the rights and benefits to which they were theretofore entitled without making compensation (Scriver v. Smith, 100 N. Y., 471; Pumpelly v. Green Bay Company, 13 Wall., 166; United States v. Cress, supra; Fulton Light H. & P. Co. v. State of New York, 200 N. Y., 400).

[fol. 38] The plea of the defendant that in the erection of the flashboards it was acting as agent of the United States government is a mere subterfuge. The Federal government could not commit a trespass upon the lands of the plaintiffs without making compensation. It could not authorize the defendant so to do. It cannot be seriously contended that the defendant erected this power house on behalf of the United States government. That work was done for its own advantage. The most that can be said is that the government permitted the defendant to do it. It is apparent from the sections of the Water Power Act to which reference has been made that neither Congress nor the Federal Water Power Commission assumed or pretended to give the defendant the privilege of injuring the properties of the plaintiffs. The conditions imposed in the license to defendant expressly negative any such idea or intention. Under these circumstances there is no basis for defendant's claim that the United States government gave it immunity to take the property of others. There is some evidence that these flashboards, in some indefinite degree, tend to improve conditions in navigation. It is admitted that in the construction of the dam the pool was designed to have an elevation of 15.2 B. C. D., and the channel was excavated to give a 12-foot depth with the water at this elevation. It is,

perhaps, true that some incidental benefit to navigation may result from defendant's act. The regulations approved by the Secretary of War provide that "flashboards may be maintained." This is permissive only and does not relieve the defendant from responsibility or liability. The provisions of the license dispose of this contention. There, it is specifically provided that "each licensee hereunder shall be liable for all damages occasioned to the property of others * * *," and that "in no event shall the [fol. 39] United States be liable therefor." The plaintiffs have no right of action against the United States. It is elementary that no suit can be maintained against the government without express authority of Congress (Stanley v. Schwalby, 162 U. S., 255; United States v. Clark, 33 U. S., 436). Here, the United States has not only not given its consent, but it has specifically provided against any liability. The conduct of the defendant constitutes a trespass upon the plaintiffs' property rights, and the license affords no justification for its act. It is not yet the law of the land that the ipse dixit of the Secretary of War, or of any other official, is sufficient warrant to justify a physical invasion of plaintiffs' property rights and leave them remediless.

The plaintiffs are entitled to a permanent injunction, and a reference will be ordered to ascertain the damages which they have sustained.

Judgment is hereby directed accordingly.

IN SUPREME COURT OF NEW YORK

[Title omitted]

DECISION

The issues of fact in this action (other than the issue as to the damages suffered by the plaintiffs by reason of the [fol. 40] maintenance by the defendant of the flashboards hereinafter described on the Federal dam at Troy during a portion of the year 1925 which issue the parties stipulated to try before a referee to be appointed by the court after the disposition of the other issues herein) having come on

to be tried by the court at the May, 1926, Trial Term of the Supreme Court in Saratoga County held by the undersigned and having been tried on the 10th and 11th days of June, 1926, and the allegations and evidence of the parties having been heard, and due deliberation having been had and

After hearing Thomas O'Connor, attorney, and George E. O'Connor, of counsel for the plaintiffs, and Whalen, Murphy, McNamee & Creble, attorneys, and Robert E. Whalen and Charles E. Nichols, Jr., of counsel for the defendant, I decide and find as follows:

Findings of Fact

First. That the dam and hydraulic canal of the plaintiffs, referred to in the complaint and known as Kings dam and Kings canal, were constructed in or about the year 1828 by the predecessors in title of the plaintiffs and are located in the town of Waterford, Saratoga County on the northernmost branch or "sprout" of the Mohawk river.

Second. That said dam and canal and the land adjoining same, upon which are located the mills of the plaintiffs, together with the water power made available by said dam and canal, have been owned, possessed, used, occupied, operated, and maintained by the plaintiffs and their predecessors in title continuously since in or about the year 1828.

[fol. 41] Third. That in or about the year 1922 the defendant constructed in, and upon the west bank of, the Hudson river in the village of Green Island, Albany County, New York, and a short distance downstream from the confluence of the Mohawk and Hudson rivers an hydro-electric power plant for the development of water power and the conversion of the same into electrical energy; that said defendant has ever since operated, and now is operating, said power plant and that the water used for such purpose is drawn from the pool formed by a concrete dam, known as the Federal dam, erected in or about the year 1915 by the government of the United States across the Hudson river between the City of Troy, Rensselaer County, New York, and said Village of Green Island.

Fourth. That the said Federal dam in the Hudson river at Troy, replaced the old State dam which had theretofore

existed in the river near the same location; that the old State dam had a crest elevation of 13.23 feet Barge canal datum.

Fifth. That the elevation of the crest of the easterly section of said Federal dam at Troy is 15.2 feet Barge canal datum; that the elevation of the crest of the westerly section of that dam is 17.2 feet Barge canal datum; that the easterly section is 586 feet in length and extends perpendicularly out from the east bank of the river; that the westerly section is 669 feet in length and extends diagonally downstream to the head gates of the defendant's power plant.

Sixth. That the defendant is a corporation organized under the Business Corporations Law of the State of New York; that it is not a public service corporation; that the power produced by the defendant in its said hydro-electric power plant is used in the adjoining private manufacturing [fol. 42] plant of the Ford Motor Company, a private corporation of which the defendant is a subsidiary.

Seventh. That on or about the 16th day of June, 1925, the defendant, for the purpose of aiding and improving the operation of its water power plant and of increasing the power which it could procure therefrom, erected upon the crest of said dam in the Hudson river at Troy, barriers or boards known as flashboards.

Eighth. That the flashboards installed by the defendant as aforesaid were installed on the entire crest of the said easterly section of the Troy dam and consist of two twelve-inch planks; that their crest is approximately two feet above the concrete crest of said easterly section.

Ninth. That the defendant installed said flashboards on said dam in connection with the operation of its power house.

Tenth. That there is no necessity for the use of these flashboards for navigation purposes because the Government dam was designed to be sufficient under normal conditions for navigation purposes without flashboards.

Eleventh. That the effect of the defendant's power plant and the flashboards is virtually negligible so far as navigation is concerned.

Twelfth. That the dam and lock at Troy were maintained by the Federal government and used for navigation from 1915 to 1925; that during said period no flashboards were placed or maintained on said dam.

Thirteenth. That the pool of the said Federal dam at Troy extends to the tailraces of the hydraulic plants of the plaintiffs so that the elevation of the water at said Troy [fol. 43] dam is controlling upon the elevation of the water in the tailraces of the said hydraulic plants of the plaintiffs.

Fourteenth. That the maintenance of said flashboards on the Troy dam increases the elevation of the water at the Troy dam, and, therefore, at the tailraces of the plaintiffs' hydraulic plants; that the head of water upon plaintiffs' hydraulic equipment and therefore the water power available therefrom is thereby reduced in proportion to such increase in the elevation of the water surface at said Troy dam.

Fifteenth. That the maintenance of said flashboards causes a backing of water upon the lands, buildings, and hydraulic plants of the plaintiffs and decreases the amount of water power available on said lands and from said hydraulic plants.

Sixteenth. That the maintenance of said flashboards by the defendant at all times causes a loss of power available from the hydraulic plants of the plaintiffs, the loss frequently amounting to as much as fourteen per cent of the water power which would otherwise be available to the plaintiffs.

Seventeenth. That as a result of the maintenance of said flashboards, the elevation of the water in the plaintiffs' tailraces and upon their lands, hydraulic equipment, and buildings has been increased as aforesaid and the plaintiffs' available water power has been correspondingly decreased as aforesaid whether the condition with defendant's plant in operation and the flashboards on the Troy dam be compared with the condition from 1923 to 1925 when the

defendant's plant was in operation but there were no flashboards, or with the condition from 1915 to 1923 when the [fol. 44] Federal dam was in existence but neither the defendant's plant nor the flashboards were in operation.

Eighteenth. That the maintenance of said flashboards by the defendant has occasioned and will occasion serious damage to the plaintiffs and to their water power, lands, and buildings and to the operation and use thereof by the plaintiffs.

Nineteenth. That the maintenance of the flashboards by the defendant as aforesaid will occasion irreparable injury to the plaintiffs and to their said property.

Twentieth. That the Mohawk river from Lock No. 2, Erie canal in Waterford westerly to the Crescent dam is, in fact, incapable of navigation because of the falls and rapids therein; that navigation is carried around this stretch of the river by means of the Barge canal which leaves the river at said Lock No. 2, Erie canal in Waterford and extends westerly through the uplands to the Mohawk river entering the same above the said Crescent dam; that the lands and water power of the plaintiffs are located in said portion of the river which is not, in fact, capable of navigation.

Twenty-first. That the tide does not extend to the aforesaid lands of the plaintiffs.

Twenty-second. That the flashboards formerly maintained on the old State dam in the Hudson river at Troy were maintained thereon only during the summer months.

Conclusions of Law

First. That the act of the defendant in placing said flashboards upon said Troy dam and thereby raising the elevation of the water upon the aforesaid property of the plain- [fol. 45] tiffs constitutes a continuous trespass upon said property of the plaintiffs.

Second. That the plaintiffs have no adequate remedy at law.

Third. I accordingly direct judgment for the plaintiffs and against the defendant enjoining the defendant forever from maintaining said flashboards on the crest of the said dam in the Hudson river at Troy and from maintaining any other obstructions on said dam whereby the height thereof and the elevation of the water thereby impounded is or will be in any manner raised, and from doing any other act or thing which will cause the raising of the elevation of the water upon the lands, buildings, and water powers of the plaintiffs.

Fourth. I direct that the plaintiffs recover against the defendant the costs of this action.

Fifth. Pursuant to the stipulation of the parties an order may be entered appointing Matthew Dwyer, Esq., an attorney at law of Amsterdam, N. Y., as referee to take the evidence of the parties with reference to the damages severally sustained by the plaintiffs by reason of the maintenance of said flashboards on said dam in the Hudson river at Troy during the year 1925 and to return the same to this court with his opinion thereon with all convenient speed.

Sixth. I further direct that each of the plaintiffs severally recover of the defendant the damage so determined to have been sustained by it and that the amounts of such damage be included in the judgment hereby directed to be entered after the confirmation by this court of the findings of said referee.

[fol. 46] Seventh. I further direct that judgment be not entered herein until the amounts of such damage shall have been determined as aforesaid.

Dated June 11, 1926.

Christopher J. Heffernan, Justice Supreme Court.

In Supreme Court of New York

[Title omitted]

Defendant's Requests to Find

Appending to each request a supporting reference to the record, defendant respectfully requests the court to make the following findings of fact and conclusions of law herein:

Findings of Fact

1. Each of the parties to this action is a domestic corporation, duly organized and existing under the Laws of the State of New York.

Found. C. J. H. Complaint, first four paragraphs.

[fol. 47] 2. Plaintiffs are the owners and in possession of certain land, reparian and water rights and water-power rights in, on, under and along the so-called north or fourth branch of the Mohawk river, west of the confluence thereof with the Hudson river, in the town of Waterford, County of Saratoga and State of New York, which constitute a site for the development of water power.

Found. C. J. H. Complainant, Paragraph Fifth. Answer, Paragraph 1.

3. At said site for about one hundred years last past, plaintiffs and their respective predecessors in title have jointly held, owned, maintained and operated a dam across said north or fourth branch of the Mohawk river and a power canal leading from the pool formed by said dam for the purpose of developing and utilizing said water power, which dam and canal, commonly known as King's dam and King's canal, respectively, were constructed in or about the year 1828 by the predecessors in title of plaintiffs.

Found. C. J. H. Complaint, Paragraph Sixth. Plaintiffs' Exhibit 1, Paragraphs 11 and 12.

4. Plaintiffs are now jointly maintaining and operating said dam and power canal and severally developing and utilizing said water power by means of hydraulic works upon the parcels of land severally owned and possessed by plaintiffs, upon which are also located plants, consisting of mills and factories, severally owned and possessed by plaintiffs and operated by means of said water power.

Found. C. J. H. Complaint, Paragraph Seventh. Plaintiff's Exhibit 1, Paragraph 12.

[fol. 48] 5. Prior to the year 1915 there existed across the Hudson river, extending from the city of Troy, in the county of Rensselaer, to the village of Green Island, in the county of Albany, a so-called State dam, the crest elevation of which

was 13.23 feet barge canal datum, with flashboards two feet in height upon the crest thereof.

Found. C. J. H. Plaintiffs' Exhibit 1, Paragraph 9. Plaintiffs' Exhibit 9.

6. In or about the year 1915 the United States of America completed the construction of a concrete dam (hereinafter described as the Federal dam) across the Hudson river from said City of Troy to said village of Green Island, which Federal dam is situated about 15,000 feet below plaintiffs' said plants and a short distance above the site of said State dam, which said Federal dam replaced.

Found. C. J. H. Complaint, Paragraph Eighth. Plaintiffs' Exhibit 1, Paragraph 9. Plaintiffs' Exhibit 2. Testimony of Mr. Weaver.

7. Said Federal dam was constructed pursuant to Acts of Congress approved, respectively, June 25, 1910, and March 4, 1913, each entitled: "An Act Making Appropriations for the Construction, Repair and Preservation of Certain Public Works on Rivers and Harbors and for Other Purposes."

Found. C. J. H. Defendant's Exhibits 7 and 8.

8. Said Federal dam consists of two spillways, of which the east or so-called main spillway is 586 feet long and the elevation of the crest thereof is 15.2 feet barge canal datum; while the west or so-called auxiliary spillway is 669 feet [fol. 49] long and the elevation of the crest thereof is 17.2 feet barge canal datum.

Found. C. J. H. Plaintiffs' Exhibit 1, Paragraph 10. Defendant's Exhibits 1, 2, 3, 4. Testimony of Mr. Weaver.

9. When the United States built said Federal Dam it provided on said main spillway thereof concrete holes for the installation of flashboards.

Found. C. J. H. Testimony of Mr. Weaver. Defendant's Exhibit 9, page 27.

10. The Federal Power Commission is a body consisting of the Secretary of War, the Secretary of the Interior and the Secretary of Agriculture, and was established by the

Federal Water Power Act, being the Act of Congress approved June 10, 1920.

Found. C. J. H. Federal Water Power Act, Sections 1 and 30.

11. Under date of December 22, 1920, defendant filed with the Federal Power Commission its application, and exhibits thereto attached and successively designated from A to M, for a license for an hydro-electric power project at the west end of said Federal dam in said village of Green Island.

Found. C. J. H. Defendant's Exhibit 9, page 8.

12. Defendant, at the time when said application was so filed, was, ever since has been and now is, empowered to utilize water power and authorized to transact in the State [fol. 50] of New York all business necessary to effecting the purposes of a license under the Federal Water Power Act.

Found. C. J. H. Exhibit A attached to Defendant's Exhibit 9. Federal Water Power Act, Section 3.

13. Defendant's said application to the Federal Power Commission contained the following statements:

"The applicant will erect flashboards along the main spillway section of the dam as contemplated and provided for by the Corps of Engineers of the United States Army. The level of the water in the pond will not be drawn below the present crest of the dam and navigation will not be interfered with in any way."

Defendant's Exhibit 9, page 5.

"Flashboards two feet in height will be used on the main spillway section of dam utilizing the holes provided for that purpose in the spillway crest.

"No flashboards will be used on auxiliary spillway section.

"The flashboards will cause the pool level to be slightly higher than at present with ordinary flow conditions but in flood times the flashboards will go out and the flood level will be no higher than at present. In low water conditions the water level in the pool may be either slightly higher or

lower than at present, depending on the daily load curve of the power station."

Defendant's Exhibit 9, pages 27-28.

"The use of flashboards will result in the creation of a reserve of water ponded during the night when the entire [fol. 51] flow is not required. The water thus conserved will be available for lockage purposes and will increase the power available at times of low river flow. Flashboards will also provide a greater average head on the water wheels, and will consequently permit the generation of more power with the same amount of water.

"In brief, the use of flashboards on the dam will result in a higher degree of 'conservation and utilization in the public interest of the available water resources for purposes of both power and navigation.' "

Found. C. J. H. Defendant's Exhibit 9, pages 32-33.

14. Under date of March 3, 1921, the Federal Power Commission issued its water power license to defendant, granting defendant's said application which, together with the said exhibits thereto annexed, was made a part of said license.

Found. C. J. H. Answer, Paragraph 5(a). Defendant's Exhibit 10, page 3, Paragraph 2.

15. In and by the terms of said license defendant was authorized by the Federal Power Commission to construct, maintain and operate the power plant specified in said application and mentioned in the complaint herein.

Found. C. J. H. Answer, Paragraph 5(a). Defendant's Exhibit 10, page 2.

16. With respect to the project for said power plant, known and designated by the Federal Power Commission [fol. 52] as Project No. 13, the Federal Power Commission in its said license found as follows:

"that the said project, including the maps, plans, and specifications, are best adapted to a comprehensive scheme of improvement and utilization of said stream for purposes of navigation, of water-power development, and of other beneficial uses; and that the contemplated improvement is

desirable and justified in the public interest for the purpose of improving and developing the Hudson River for the use and benefit of interstate or foreign commerce."

Found. C. J. H. Answer, Paragraph 5(a). Defendant's Exhibit 10, pages 1 and 2.

17. The plans for alterations in said Federal dam and for other structures affecting navigation, as set forth in defendant's said application, were approved by the Chief of Engineers of the Army and by the Secretary of War.

Found. C. J. H. Defendant's Exhibit 10, page 2.

18. In or about the year 1922 defendant constructed said hydro-electric power plant, which defendant has ever since operated and is now operating by means of water drawn from the pool formed by said Federal dam.

Found. C. J. H. Complaint, Paragraph 8.

19. Paragraph 7 of said license contains the following provision:

"The Licensee shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including the control of the level of pools, as may be [fol. 53] made from time to time by the Secretary of War."

Found. C. J. H. Defendant's Exhibit 10, page 4.

20. In a letter dated September 22, 1924, received in evidence as Plaintiffs' Exhibit 17 in this action, defendant requested the War Department "that we be permitted to install flashboards on the Troy dam in connection with the operation of our power-house," in accordance with blueprints attached to said letter.

Found. C. J. H. Plaintiffs' Exhibit 17.

21. In a letter to defendant dated January 12, 1925, and received in evidence as Plaintiffs' Exhibit 18 in this action, the War Department wrote to defendant as follows:

"Referring to your request of Sept. 22, 1924, for permission to install flashboards on the Troy Dam in connection with the operation of your power-house, there is enclosed herewith, copy of regulations approved by the Secretary of War on Dec. 2, 1924, to 'Govern the Regulation of Pool

Level and Maintenance of Flashboards at the Federal Dam, Troy, N. Y., under Water Power License No. 13, Granted to Henry Ford & Son, Inc.' "

Found. C. J. H. Plaintiffs' Exhibit 18.

22. With the letter last aforesaid the War Department transmitted to defendant regulations approved by the Secretary of War December 2, 1924, received in evidence as Defendant's Exhibit 11 in this action, and bearing the caption:

"Regulations to govern the regulation of pool level and maintenance of flashboards at the Federal Dam, Troy, [fol. 54] N. Y., under Water Power License No. 13, granted to Henry Ford & Son, Inc."

Found. C. J. H. Answer, Paragraph 5 (c). Defendant's Exhibit 11, and blueprints thereto attached.

23. Said regulations provide for the maintenance of flashboards on the east or main spillway of said Federal dam to a height of 16.33 feet above mean sea level, which is equivalent to 17.2 feet barge canal datum, and is the same as the height of the crest of the west or auxiliary spillway of said dam.

Found. C. J. H. Answer, Paragraph 5 (c). Plaintiffs' Exhibit 1, Paragraph 1. Defendant's Exhibit 11, Paragraphs 1 and 2.

24. Said flashboards, two feet in height, were installed by defendant on or about the 16th or 17th days of June, 1925, upon the east or main spillway of said Federal dam, to a height of 17.2 feet barge canal datum, which is the same as the elevation of the west or auxiliary spillway of said dam, and is 16.33 feet above mean sea level.

Found. C. J. H. Complaint, Paragraph Ninth. Plaintiffs' Exhibit 1, Paragraphs 8 and 10. Answer, Paragraph 5 (b).

25. The purpose of defendant in so installing said flashboards was to aid and improve the operation of its said water-power plant and to increase the power which defendant could procure therefrom.

Found. C. J. H. Complaint, Paragraph Ninth. Answer, Paragraph 3.

[fol. 55] 26. The purpose of the Government of the United States in providing for such installation of said flashboards was to aid navigation or the use and benefit of interstate and foreign commerce.

Refused. C. J. H. Answer, Paragraph 6. Defendant's Exhibit 10, page 2. Defendant's Exhibit 10, page 4, Paragraph 7. Defendant's Exhibit 11. Plaintiffs' Exhibit 18.

27. The maintenance of said flashboards, in the position in which they were installed, as specified in Finding of Fact No. 24 hereof, is an aid to navigation and a benefit to interstate and foreign commerce.

Refused. C. J. H. Answer, Paragraph 5 (a). Defendant's Exhibit 10, page 2. Defendant's witnesses Wiseman and Burr.

28. Said regulations, received in evidence as Defendant's Exhibit 11 in this action, were made by the Secretary of War in the interest of navigation and pursuant to the provisions of said license.

Refused. C. J. H. Defendant's Exhibit 10, page 4, Paragraph 7. Caption to Defendant's Exhibit 11.

29. The installation and maintenance of said flashboards conform to the provisions of said regulations.

Found. C. J. H. Defendant's witness Perkins.

[fol. 56] 30. Said flashboards, when in the position in which they were installed as found in Finding of Fact No. 24 hereof, have caused to plaintiffs' said plants a loss of head.

Found. C. J. H. Plaintiffs' witness Weaver. Defendant's witness Wood.

31. In installing and maintaining said flashboards, as found in Finding of Fact No. 24 hereof, defendant acted for and as an agency of the Government of the United States.

Refused. C. J. H. Defendant's Brief, pages 12-14.

32. In the installation and maintenance of said flashboards defendant has acted with due care and skill.

Found. C. J. H. Answer, Paragraph 7. (Such is the presumption in the absence of evidence to the contrary.)

33. The Hudson river and the Mohawk river at all of the times and at the several places hereinbefore mentioned were and now are navigable waters.

Found, except as found in the 20th Finding of Fact appearing in the decision of the court herein dated June 11, 1926. C. J. H. Answer, Paragraph 5 (c). Defendant's Brief, page 7.

Conclusions of Law

First. Plaintiffs' ownership and possession of the water rights and water-power rights mentioned in Finding of Fact No. 2 hereof are subject and subordinate to the paramount authority of Congress to improve navigation for the benefit of interstate and foreign commerce, pursuant to the power of Congress to regulate commerce with foreign na- [fol. 57] tions and among the several States as granted by Clause 3 of Section 8 of Article I of the Constitution of the United States.

Found, with a further finding that plaintiffs' property rights cannot be taken except upon making compensation. C. J. H. Scranton v. Wheeler, 179 U. S. 141. Gibson v. U. S., 166 U. S., 269.

Second. The Federal Water Power Act, the said license so issued by the Federal Power Commission to defendant, and said regulations so approved by the Secretary of War December 2, 1924, constitute and afford to defendant a title, right, privilege and immunity to install and maintain said flashboards upon said main spillway of said Federal dam at a height not exceeding 16.33 feet above mean sea level, which is equivalent to 17.2 feet barge canal datum.

Refused. C. J. H. Answer, Paragraph 5 (c).

Third. In installing and maintaining said flashboards upon said main spillway of said Federal dam at a height not exceeding 16.33 feet above mean sea level, which is equivalent to 17.2 feet barge canal datum, defendant acted

for and as an agency of the Government of the United States which, in the exercise of the power of Congress to regulate commerce with foreign nations and among the several States, as granted by Clause 3 of Section 8 of Article I of the Constitution of the United States, has authorized, approved and provided for the installation and maintenance of said flashboards for the improvement of navigation in furtherance of interstate and foreign commerce.

Refused. C. J. H. Answer, Paragraph 6.

Fourth. The aforesaid loss of power at plaintiffs' plants, specified in Finding of Fact, No. 30 hereof, is damnum [fol. 58] absque injuria, for which none of the plaintiffs can recover.

Refused. C. J. H.

Fifth. The provisions of the Fifth Amendment of the Constitution of the United States do not entitle plaintiffs to maintain this action.

Refused. C. J. H. Scranton v. Wheeler, 179 U. S., 141. Gibson v. U. S., 166 U. S., 269.

Sixth. The provisions of Section 10 (c) of the Federal Water Power Act do not entitle plaintiffs to maintain this action.

Refused. C. J. H.

Seventh. Plaintiffs are not entitled to the injunctive relief which they seek herein.

Refused. C. J. H.

Eighth. The complaint should be dismissed upon the merits, with costs, the temporary injunction herein entered should be dissolved, and judgment should be entered accordingly.

Refused. C. J. H.

All of which is respectfully submitted.

Dated July 2, 1926.

Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

Office and Post Office address: 126 State Street, Albany, New York.

[fol. 59] IN SUPREME COURT OF NEW YORK

[Title omitted]

DEFENDANT'S NOTICE OF EXCEPTIONS

To the Clerk of the County of Saratoga and Thomas O'Connor, attorney for plaintiffs:

Take notice, that, to the decision of Mr. Justice Heffernan herein, bearing date June 11, 1926, and filed in Saratoga County Clerk's office September 28, 1926, and to the several refusals of said Justice to make the several findings of fact and conclusions of law hereinafter specified and set forth in defendant's requests to find, bearing date July 2, 1926, the above-named defendant respectfully excepts as follows:

1. To so much of the finding of fact contained in the paragraph numbered and designated "Seventh" in said decision as finds and decides that the erection of the flashboards therein specified was for the purpose of aiding and improving the operation of defendant's water-power plant and of increasing the power which defendant could procure therefrom;

[fol. 60] 2. To each and every finding of fact contained in the paragraph numbered and designated "Tenth" in said decision;

3. To each and every finding of fact contained in the paragraph numbered and designated as "Eleventh" in said decision;

4. To each and every finding of fact contained in the paragraph numbered and designated as "Fourteenth" in said decision;

5. To so much of the finding of fact contained in the paragraph numbered and designated "Fifteenth" in said decision as finds and decides that the maintenance of said flashboards causes a backing of water upon the lands of the plaintiffs and decreases the amount of water power available on said lands;

6. To so much of the finding of fact contained in the paragraph numbered and designated "Sixteenth" in said deci-

sion as finds and decides that the maintenance of said flashboards at all times causes a loss of power available from the hydraulic plants of the plaintiffs;

7. To each and every finding of fact contained in the paragraph numbered and designated "Seventeenth" in said decision;

8. To each and every finding of fact contained in the paragraph numbered and designated "Eighteenth" in said decision;

9. To each and every finding of fact contained in the paragraph numbered and designated "Nineteenth" in said decision;

10. To so much of the finding of fact contained in the paragraph numbered and designated as "Twentieth" in [fol. 61] said decision as finds and decides that the Mohawk river, from lock No. 2 Erie canal in Waterford westerly to the Crescent dam, is, in fact, incapable of navigation;

11. To each and every conclusion of law contained in the paragraph of said decision numbered and designated as "First" under the heading of Conclusions of Law;

12. To each and every conclusion of law contained in the paragraph of said decision numbered and designated as "Second" under the heading of Conclusions of Law;

13. To each and every direction and to each and every conclusion of law contained in the paragraph of said decision numbered and designated as "Third" under the heading of Conclusions of Law;

14. To each and every direction and to each and every conclusion of law contained in the paragraph of said decision numbered and designated as "Fourth" under the heading of Conclusions of Law;

15. To each and every direction and to each and every conclusion of law contained in the paragraph of said decision numbered and designated as "Sixth" under the heading of Conclusions of Law;

16. To the refusal of said Justice to make the finding of fact numbered and designated "26" in defendant's said requests to find;

17. To the refusal of said Justice to make the finding of fact numbered and designated "27" in defendant's said requests to find;

[fol. 62] 18. To the refusal of said Justice to make the finding of fact numbered and designated "28" in defendant's said requests to find;

19. To the refusal of said Justice to make the finding of fact numbered and designated "31" in defendant's said requests to find;

20. To the refusal of said Justice to make, without qualification, the finding of fact numbered and designated "33" in defendant's said requests to find;

21. To the conclusion of law in the following words: "That plaintiffs' property rights cannot be taken except upon making compensation," which conclusion of law was made by said Justice in connection with the conclusion of law numbered and designated as "First" in defendant's said requests to find;

22. To the refusal of said Justice to make the conclusion of law numbered and designated as "Second" in defendant's said requests to find;

23. To the refusal of said Justice to make the conclusion of law numbered and designated as "Third" in defendant's said requests to find;

24. To the refusal of said Justice to make the conclusion of law numbered and designated as "Fourth" in defendant's said requests to find;

25. To the refusal of said Justice to make the conclusion of law numbered and designated as "Fifth" in defendant's said requests to find;

26. To the refusal of said Justice to make the conclusion of law numbered and designated as "Sixth" in defendant's said requests to find;

[fol. 63] 27. To the refusal of said Justice to make the conclusion of law numbered and designated as "Seventh" in defendant's said requests to find;

28. To the refusal of said Justice to make the conclusion of law numbered and designated as "Eighth" in defendant's said requests to find.

Dated June 13, 1927.

Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

Office and Post Office address: 126 State Street, Albany, New York.

In Supreme Court of New York

[Title omitted]

Stipulation as to Damages

In lieu of findings by the Referee, appointed by an order of the Supreme Court dated September 28, 1926, and entered in Saratoga County Clerk's Office on September 30, [fol. 64] 1926, to ascertain the amount of damages, if any, severally sustained by the plaintiffs herein by reason of the maintenance of flashboards, mentioned and described in the decision of the Court herein, dated June 11, 1926, and filed in Saratoga County Clerk's office September 28, 1926, on the Federal dam at Troy, New York, during the year 1925, it is hereby

Stipulated by and between the attorneys for the respective parties hereto, for the purpose of this action only and not as an admission by any of the parties to be used for or against them, or any of them, in any subsequent action or proceeding in any court or before any tribunal, that the plaintiff Little Falls Fibre Company will make no claim for an allowance of money damages for the year 1925; that the plaintiff Asbestos Spinning and Weaving Corporation sustained damage as aforesaid in the sum of Two Hundred Ten Dollars ($210); and that the plaintiff Mohawk Paper Makers, Inc., for which the plaintiffs Harry A. Furman and Henry W. Brooks, Jr., as receivers of said Mohawk Paper Makers, Inc., have been substituted as

parties plaintiff herein, sustain damage as aforesaid in the sum of Five Thousand Dollars ($5,000); and it is further

Stipulated that said amounts of damages be included in the judgment directed to be entered herein by said decision of the court, as if the same had been found by the Referee and confirmed by the court.

Dated February 21, 1927.

Thos. O'Connor, Plaintiffs' Attorney. Whalen, Murphy, McNamee & Creble, Defendant's Attorneys.

[fol. 65] IN SUPREME COURT OF NEW YORK

[Title omitted]

JUDGMENT

The issues of fact in this action (other than the issue as to the damages suffered by the plaintiffs by reason of the maintenance by the defendant of the flashboards hereinafter described on the Federal dam at Troy during a portion of the year 1925 which issue the parties stipulated to try before a referee to be appointed by the Court after the disposition of the other issues herein) having come on to be tried by the Court at the May 1926 Trial Term of the Supreme Court in Saratoga County held by Mr. Justice Heffernan and having been tried on the 10th and 11th days of June, 1926, and the plaintiffs appearing by Thomas O'Connor, attorney, and George E. O'Connor, of counsel, and the defendants appearing by Whalen, Murphy, McNamee & Creble, attorneys and Robert E. Whalen and Charles E. Nichols, Jr., of counsel,

And the court having heard the allegations and proof of the parties, and after due deliberation, having made and filed its decision in the office of the Clerk of the County of [fol. 66] Saratoga on the 28th day of September, 1926, containing a statement of the facts found and the conclusions of law thereon and directing judgment for the plaintiffs in the manner hereinafter provided, and the Court having, by an order dated September 28, 1926, appointed Matthew Dwyer, Esq., attorney at law of Amsterdam, N. Y., as ref-

eree to take the evidence of the parties with reference to the damages severally sustain-d by the plaintiffs by reason of the maintenance of certain flashboards on the dam in the Hudson river at Troy during the year 1925 and to return the same to this Court with his opinion thereon with all convenient speed, and the said issue as to damages having duly and regularly come on for trial, by a stipulation of the parties, at the Courthouse in the City of Albany on the 25th and 26th days of January, 1927, the plaintiffs appearing by Thomas O'Connor, attorney, and George E. O'Connor, of counsel, and the defendant appearing by Whalen, Murphy, McNamee & Creble, attorneys and Charles E. Nichols, Jr., counsel, and the referee having heard the allegations and proofs of the parties,

And thereafter the parties having entered into a stipulation bearing date the 21st day of February, 1927, and filed in the office of the Clerk of the County of Saratoga on the 7th day of March, 1927, in and by the terms of which it is stipulated that the plaintiff Little Falls Fibre Company would make no claim for an allowance of money damages for the year 1925; that the plaintiff Asbestos Spinning and Weaving Corporation sustained damages in the sum of Two Hundred Ten dollars ($210) during the year 1925 by reason of the maintenance of the flashboards mentioned and described in the aforesaid decision herein; and that plaintiff Mohawk Paper Makers, Inc., for which Harry A. [fol. 67] Furman, Charles H. Burrows, and Clarence T. Wright as receivers of said Mohawk Paper Makers, Inc., have been substituted parties plaintiff herein, sustained damages by reason of the maintenance of said flashboards during the year 1925 in the sum of Five Thousand Dollars ($5,000) and the parties having agreed in and by the terms of said stipulation that the said amounts of damages as aforesaid be included in the judgment directed to be entered herein by the aforesaid decision of this Court as if the same had been found by the Referee and confirmed by the Court.

And Harry A. Furman and Henry W. Brooks, Jr., as Receivers of the plaintiff Mohawk Paper Makers, Inc., having been duly substituted as parties plaintiffs herein in the place and stead of said Mohawk Paper Makers, Inc., by an order of this Court entered in the office of the Clerk of the County of Saratoga on the 12th day of January, 1927.

And Charles H. Burrows and Clarence T. Wright, as Receivers of said Mohawk Paper Makers, Inc., having been duly substituted as parties plaintiff in the place and stead of said Henry W. Brooks, Jr., as such Receiver by an order of this Court bearing date the 4th day of June, 1927, and filed in the office of the Clerk of the County of Saratoga June 6, 1927.

And an order of this Court having been made at a Special Term thereof held March 26, 1927, and entered in the office of the Clerk of the County of Saratoga on the 31st day of May, 1927, granting to the plaintiffs an additional allowance under and in pursuance of Section 1513 of the Civil Practice Act in the sum of Two Hundred Sixty Dollars and Fifty Cents ($260.50), and the decision of this Court having allowed to the plaintiffs the costs of this action, and the said costs having been duly taxed in the sum [fol. 68] of Three Hundred Sixty-four Dollars and Sixteen Cents, it is

Now, on motion of Thomas O'Connor, attorney for the plaintiffs herein, ordered, adjudged, and decreed:

1. That the defendant be and it hereby is forever enjoined from maintaining flashboards on the crest of the dam in the Hudson river extending between the City of Troy, Rensselaer County and the Village of Green Island, Albany County, and from maintaining any other obstruction on said dam whereby the height thereof or the elevation of the water thereby impounded is or will be in any manner raised and from doing any other act or thing which will cause the raising of the elevation of the water upon the lands, buildings or water powers of the plaintiffs.

2. That the plaintiffs Harry A. Furman, Charles H. Burrows and Clarence T. Wright, as Receivers of said Mohawk Paper Makers, Inc., recover of the defendant Henry Ford & Son, Inc., the sum of Five Thousand Dollars ($5,000).

3. That the plaintiff Asbestos Spinning and Weaving Corporation recover of the defendant Henry Ford & Son, Inc., the sum of Two Hundred Ten Dollars ($210.00).

4. That the plaintiffs Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation and Harry A. Furman, Charles H. Burrows and Clarence T. Wright, as Re-

ceivers of Mohawk Paper Makers, Inc., recover of the defendant Henry Ford & Son, Inc., the sum of Three Hundred [fol. 69] Sixty-four Dollars and Sixteen cents ($364.16) for costs, disbursements and additional allowance.

Judgment entered this 10th day of June, 1927.

Charles J. Hennessy, Clerk.

In Supreme Court of New York

[Title omitted]

Notice of Motion for Additional Allowance

You will please take notice that the plaintiffs hereby appeal to the Appellate Division of the Supreme Court, Third Department, from so much of an order herein made at a Special Term of the Supreme Court held in the City of Amsterdam March 26, 1927, and entered in the office of the Clerk of the County of Saratoga May 31, 1927, as denies to the plaintiffs any further amount over and above the sum of Two Hundred Sixty Dollars and Fifty Cents ($260.50) [fol. 70] as an additional allowance under Section 1513 of the Civil Practice Act.

Dated Waterford, N. Y., June 10, 1927.

Thos. O'Connor, Attorney for Plaintiffs.

Office and Post Office address: Waterford, Saratoga County, N. Y.

To the Clerk of the County of Saratoga, and Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

In Supreme Court of New York

[Title omitted]

Notice of Motion for Additional Allowance

You will please take notice that on the annexed affidavits of Charles J. Weaver and Thomas O'Connor verified the 9th day of March, 1927, and upon all the prior pleadings

and proceedings herein a motion will be made at a Special Term of this court appointed to be held at the Supreme Court Chambers in the City of Amsterdam on the 26th day of March, 1927, at ten o'clock in the forenoon of that day or as soon thereafter as counsel can be heard, why an order should not be made granting to the plaintiffs an additional [fol. 71] allowance pursuant to Section 1513 of the Civil Practice Act and for such further and other relief as may be just and proper besides the costs of this motion.

Dated at Waterford, N. Y., March 9, 1927.

Thos. O'Connor, Attorney for Plaintiffs.

Office and Post Office address: Waterford, Saratoga County, N. Y.

To Whalen, Murphy, McNamee & Creble, Attorneys for Defendant, 126 State Street, Albany, N. Y.

IN SUPREME COURT OF NEW YORK

[Title omitted]

AFFIDAVIT OF THOMAS O'CONNOR FOR PLAINTIFFS

STATE OF NEW YORK,
County of Saratoga, ss:

Thomas O'Connor, being duly sworn, deposes and says:

1. That he is an attorney and counselor of this Court duly licensed to practice as such and that he resides and [fol. 72] has his office in the Town of Waterford, County aforesaid.

2. That he is the attorney for the plaintiffs in the action above entitled and has been such since the commencement of this action.

3. That the plaintiffs in this action are the owners of certain water rights and manufacturing plants on the northernmost branch of the Mohawk river in the said Town of Waterford and that the water power available on their property is used in connection with the operation of the plaintiffs' plants.

4. That the defendant is the owner and in possession of an hydro-electric plant constructed on the dam in the Hudson river between the City of Troy and the Village of Green Island, which dam was constructed in or about the year 1915 by the Government of the United States.

5. That this action arose out of the fact that the defendant erected two feet of flashboards on the said Federal dam thereby backing water on the hydraulic apparatus of the plaintiffs causing a serious loss of power.

6. That the action was instituted on July 7, 1925, shortly after the flashboards were installed; that a temporary injunction was applied for at the Special Term in July and after oral argument and the submission of briefs and affidavits by both sides, an injunction pendente lite was granted in December, 1925.

7. That the action was tried on June 10 and 11, 1926, at the Saratoga Trial Term; that briefs were submitted by both sides; that in September, 1926, the Court determined that the plaintiffs were entitled to a permanent injunction [fol. 73] against the maintenance of these flashboards and a decision was thereupon prepared and filed; that the Court directed a reference to determine the amount of damages sustained by the plaintiffs through the maintenance of the flashboards during the summer of 1925; that a trial on the question of such damages was had before the Referee in Albany on January 25 and 26, 1927; that after the completion of the oral evidence on such reference a stipulation was entered into between the parties whereby it was agreed that the damages suffered by the plaintiff Mohawk Paper Makers, Inc., during the period in question amounted to Five Thousand Dollars ($5,000) and the damages of the plaintiff Asbestos Spinning and Weaving Corporation amounted to Two Hundred Ten Dollars ($210); that the plaintiff Little Falls Fibre Company determined to make no claim for money damages for the period in question for the reason that it was not, during that period, in full operation of its hydraulic plant.

8. That final judgment in this case is now in order but judgment has not as yet been entered nor have the costs herein been taxed.

9. That the subject matter of the action was the right of the plaintiffs to enjoy their water power free from the interference resulting from the maintenance of flashboards on the Troy dam.

10. That the defendant took the position that no water was backed on the plaintiffs' property by these flashboards or, if there was any back water, that it was not in substantial amount; that the defendant also claims that a permit to maintain the flashboards granted by the Secretary of War under regulations adopted by the Federal Power [fol. 74] Commisison gave the defendant the right to maintain the flashboards regardless of the consequences to the plaintiffs.

11. That the case involved difficult questions of fact consisting principally of engineering questions, both sides resorting very extensively to expert engineering testimony; that the oral testimony on the main trial consisted of 286 pages mainly technical engineering evidence; that numerous exhibits were introduced by both sides bearing upon the engineering problems and also on the Federal question.

12. That on the reference for damages it was necessary to establish the actual back water for each day during the period from June 16, 1925, to October 25, 1925, and the amount of power thereby lost to the plaintiffs; that it was then necessary to establish the cost of replacing such power by steam in the case of the plaintiff Mohawk Paper Makers, Inc., and by electricity in the case of the other two plaintiffs; that the testimony in that trial occupied two days and consisted almost exclusively of engineering evidence; that because of the stipulation aforementioned, the minutes of that trial were not transcribed.

13. That the disbursements of the plaintiffs, exclusive of attorneys' fees, exceeded Thirteen Hundred Seventy-five Dollars ($1.375) consisting principally of engineering services.

14. That the case presented difficult and unusual questions of law which required extensive research and study and extensive briefs; that the briefs submitted by deponent on the motion for a temporary injunction consisted

of 45 pages and that the briefs submitted on the trial on behalf of plaintiffs consisted of 52 pages.

[fol. 75] 15. That deponent hereby refers, as a part of this affidavit, to the pleadings and proceedings herein including all papers used in connection with the application for and the granting of the temporary injunction, and also to the minutes in the case as well as to the decision already on file.

Thos. O'Connor.

Sworn to before me this 9th day of March, 1927.
O. W. Stokes, Notary Public.

In Supreme Court of New York

[Title omitted]

Affidavit of Charles J. Weaver for Plaintiffs

State of New York,
County of Saratoga, ss:

Charles J. Weaver, being duly sworn, deposes and says:

1. That he resides in the Town of Waterford, County aforesaid; that he is a civil engineer duly licensed to practice, and practicing, his profession as such in the State of [fol. 76] New York and that he has an office in the said Town of Waterford.

2. That he is experienced in the matter of hydraulic engineering; that he has been for many years familiar with the plants and properties of the plaintiffs located on Kings canal in the said Town of Waterford and that he has inspected and examined the hydro-electric plant of the defendant located on the Federal dam in the Village of Green Island, Albany County, N. Y.; that he testified as an expert witness on behalf of the plaintiffs in the trial of the above action and also before the Referee for the determination of damages.

3. That it was stipulated in this case, and it is the fact, that the headwater at the plaintiffs' plants is at elevation 29.6 feet above sea level Barge canal datum; that that is

the elevation of the water in the Kings canal and that elevation cannot be materially increased without endangering the banks of that canal; that the next obstruction downstream from plaintiffs' tailwater is the Federal dam at Troy, the lower or easterly crest of which has an elevation without flashboards of 15.2 feet above sea level Barge canal datum and the westerly crest an elevation of 17.2 feet; that, therefore, the gross head available on plaintiff's properties when there are no flashboards is 14.4 feet; that if two feet of flashboards are erected on the easterly section of the Federal dam at Troy, as was done in the summer of 1925, the next obstruction downstream below plaintiffs' tailwater is raised throughout its entire length to an elevation of 17.2 feet above sea level Barge canal datum, thus reducing the gross head available on plaintiff's properties to 12.4 feet.

4. That in this section of the country, and in particular, on the Mohawk and Hudson rivers, it is practical to main- [fol. 77] tain wooden flashboards from about the 1st of June to about the 1st of November in the ordinary year, though during this period occasional freshets usually damage the flashboards and require their repair.

5. That from deponent's studies in this case, as explained in his testimony and the exhibits produced in connection with his testimony, and from the testimony and exhibits offered by the defendant in this case, it is apparent that the maintenance of these flashboards causes an average loss of head to the plaintiffs of from 1.1 ft. to 1.5 ft. during the flashboard period; that the cost of replacing, either by steam or electricity, the power lost by the plaintiffs by reason of the maintenance of such flashboards would amount, in the average year, to from $5,000 to $8,000, taking into consideration only the present hydraulic equipment of the plaintiffs; that there is a very large amount of undeveloped power on plaintiffs' properties which would be similarly impaired and decreased by the maintenance of these flashboards.

6. That the plaintiffs' plants and properties are located approximately a mile from the nearest railway switch or siding and all materials must be trucked in and out of their plants; that their continued value is, therefore, very largely

dependent upon the water power available in connection with them.

7. That the presence of the flashboards on the Troy dam during the summer months causing backwater into the tailraces of the plaintiffs makes it extremely difficult and expensive to make necessary repairs to the plaintiffs' hydraulic equipment which repairs are ordinarily made during the low water summer months.

[fol. 78] 8. That deponent is familiar with the values of mill properties with and without water power in this vicinity and with sales thereof in recent years.

9. That, in the opinion of deponent, if there is an outstanding right to maintain two feet of flashboards on the easterly or lower crest of the Troy dam, the fair value of the plants and properties of the three plaintiffs located on Kings canal will be from $75,000 to $100,000 less than if there were no such outstanding right.

10. That by the maintenance of such flashboards the defendant's hydro-electric plant at Green Island would gain approximately the same amount of head which the plaintiffs' plants would lose; that while the plaintiffs' plants have available only about 50% of the flow of the Mohawk river, the defendant's plant has available the entire flow of the Hudson and practically the entire flow of the Mohawk river; that the value to the defendant of this increased head is, therefore, more than twice the value of a corresponding amount of head to plaintiffs; that, therefore, if the defendant has the right to maintain these flashboards, the value of its plant and properties will thereby be increased by a very much greater amount than the aforesaid depreciation in the value of plaintiffs' plants.

Charles J. Weaver.

Sworn to before me this 9th day of March, 1927.
O. W. Stokes, Notary Public.

[fol. 79] IN SUPREME COURT OF NEW YORK

[Title omitted]

AFFIDAVIT OF CHARLES J. WEAVER FOR PLAINTIFFS

STATE OF NEW YORK,
County of Saratoga, ss:

Charles J. Weaver, being duly sworn, deposes and says:

1. That he resides in the Town of Waterford, County aforesaid; that this affidavit is supplemental to the affidavit in this action heretofore verified by deponent on the 9th day of March, 1927.

2. That the fair value of the head or fall of water on plaintiffs' premises of which plaintiff would be deprived (and were deprived during a portion of 1925) by the maintenance by the defendant of two feet of flashboards on the easterly section of the Troy dam is $64,000 divided as follows:

Mohawk Paper Makers, Inc.	$40,000.00
Little Falls Fibre Co.	18,500.00
Asbestos Spinning and Weaving Corp.	5,500.00

Charles J. Weaver.

Sworn to before me this 11th day of May, 1927.
George E. O'Connor, Notary Public.

IN SUPREME COURT OF NEW YORK

[Title omitted]

[fol. 80] OPINION ON ORDER FOR EXTRA ALLOWANCE

Thomas O'Connor (George E. O'Connor of counsel) for the motion.

Whalen, Murphy, McNamee & Creble (Charles E. Nichols Jr., of counsel), opposed.

HEFFERNAN, J.:

This is a motion by plaintiffs for an extra allowance of costs. Section 1513 of the Civil Practice Act provides for

the granting of an extra allowance "in a difficult and extraordinary case, where a defense has been interposed in an action," which shall not exceed five per centum "upon the sum recovered or claimed, or the value of the subject matter involved." It is conceded that this action is both difficult and extraordinary and the sole question is the amount of the extra allowance which the court, in its discretion, may award to the plaintiffs.

The action is in equity. The plaintiffs sought and obtained a permanent injunction restraining defendant from maintaining flashboards on the Federal dam in the [fol. 81] Hudson river at Troy, and a judgment for the removal of such flashboards. The parties have a common interest in the stream. The maintenance of these flashboards resulted in the continuous loss of power to plaintiffs from their hydraulic plants and by this method the defendant procured additional power for its own use. It has been stipulated that the amount of damages sustained by two of the three plaintiffs from June 16, 1925, to October 25, 1925, the period when the flashboards were in operation, is $5,210. No claim for damages on behalf of the third plaintiff was asserted because during that period it was remodeling its mill and its hydraulic plant was not in operation.

The defendant contends that the amount of damages recovered by plaintiffs is the only basis for the computation of an extra allowance. The plaintiffs take the position that the maintenance of these flashboards depreciated the value of their plants and properties approximately from $75,000 to $100,000. They also insist that the fair value of the head or fall of water on their premises, of which they would be deprived by the use of flashboards is $64,000 apportioned among them, and that the extra allowance should be computed accordingly.

It is not profitable to attempt a definition of the term "subject matter involved" or to analyze the cases on the subject. It is difficult to do either. As I view it, however, the subject matter involved in this controversy is the right to erect and maintain the flashboards and damages caused thereby to plaintiffs' properties. It does not mean the properties of plaintiffs which may be directly or remotely affected by the result. The value of plaintiffs' properties

with and without flashboards is only incidentally in issue. I am, therefore, convinced that five per cent of the amount [fol. 82] recovered by plaintiffs, namely $260.50, is the maximum sum which the court is authorized to grant on this application. This has been an expensive case for plaintiffs, and if the power existed it justifies the aggregate allowance which the court is authorized to make in any case. In order that the plaintiffs may not be embarrassed in reviewing this determination the order to be entered hereon may contain a provision to the effect that the amount allowed is not the result of judicial discretion, but is controlled by statutory limitation. An order may be sustained accordingly.

IN SUPREME COURT OF NEW YORK

[Title omitted]

ORDER GRANTING EXTRA ALLOWANCE—March 26, 1927

On reading and filing the affidavits of Thomas O'Connor and Charles J. Weaver, verified March 9, 1927, the affidavit [fol. 83] of Charles J. Weaver verified May 11, 1927, and upon all prior pleadings and proceedings herein, and on reading and filing the notice of motion by the plaintiffs dated March 9, 1927, and returnable at this time and place for an order granting to the plaintiffs an additional allowance pursuant to Section 1513 of the Civil Practice Act.

And after hearing George E. O'Connor, of counsel for the plaintiffs, and Charles E. Nichols, Jr., of counsel for the defendant, and due deliberation having been had, and the court being of the opinion, as a matter of discretion, that the plaintiffs are entitled to the maximum allowance which the court is authorized to make in any case, to wit, Two Thousand Dollars ($2,000.00), but that, as a matter of law, the court is limited in this case by statutory restriction to granting an allowance amounting to five per cent of the money damages recovered by the plaintiffs, it is hereby

Ordered, That the motion of the plaintiffs be and it hereby is granted to the extent of granting to the plaintiffs an additional allowance of costs, under and pursuant to Section 1513 of the Civil Practice Act, in the sum of Two Hundred Sixty Dollars and Fifty Cents ($260.50), that be-

ing five per cent of the sum recovered by the plaintiffs as money damages in this action, which sum shall be recovered by the plaintiffs from the defendant as a part of the costs of this action; that the plaintiffs' motion for any further amount as an additional allowance under said section of the Civil Practice Act be and the same hereby is denied.

Enter in Saratoga County.

Christopher J. Heffernan, Justice Supreme Court.

[fol. 84] IN SUPREME COURT OF NEW YORK

[Title omitted]

Case

Case tried at a trial term of the Supreme Court, held at the court-house, in the village of Ballston Spa, N. Y., on the 10th day of June, 1926, before Mr. Justice Heffernan.

APPEARANCES OF COUNSEL

Thomas O'Connor and George E. O'Connor for the plaintiffs.

Whalen, Murphy, McNamee & Creble, by Robert E. Whalen and Charles E. Nichols, Jr., of counsel, for the defendant.

CHARLES J. WEAVER, called as a witness by the plaintiff, sworn, direct examination by Mr. George O'Connor as follows:

Mr. George O'Connor: I offer in evidence a stipulation entered into between the attorneys for the parties, under date of March 2, 1926: And in offering that in the record, I wish to have it noted that the stipulation expressly provides that it shall not preclude either party from objecting to the relevancy or materiality of the matters to which reference is therein made. There are certain facts which we are willing to concede are facts but which we contend are [fol. 85] not material in the case but we have agreed upon them in order that the case may be tried more rapidly.

Received and marked Plaintiffs' Exhibit No. 1.

Mr. George O'Connor: I offer in evidence map marked as location and flowage map, showing the general situation in the vicinity of the properties involved.

Received and marked Plaintiffs' Exhibit No. 2.

Q. Where do you reside?

A. Waterford, N. Y.

Q. What is your profession?

A. Civil and consulting engineer.

Q. Will you tell us what your experience and education has been?

A. I was educated at the Rensselaer Polytechnic Institute where I graduated in 1906 with the degree of civil engineer. Since that time I have been actively engaged in the practice of civil engineering in various parts of the country. At present I am in the practice of my profession at Waterford and have been since 1920.

Q. Referring to the map which has been marked Plaintiffs' Exhibit No. 2 will you tell us in general what that map shows?

A. This is a general map showing the vicinity of Troy, part of Troy, and Waterford, Green Island, Cohoes, with a special reference to the hydraulic features. It shows first a part of the Hudson river which flows from the north to the south or on the map from the direction of the right-hand side to that of the left. It shows the Mohawk river coming from the upper right center of the map and flowing into the Hudson through its various sprouts, which have been indicated. It also shows the Barge canal, the Erie Division of the Barge canal, coming in from above the Crescent dam into the Hudson river, or into the northerly spur of the Mohawk, and thence into the Hudson river. It shows the [fol. 86] location towards the left-hand side of the map of the old State dam.

Q. Is that marked in black?

A. Yes, that is indicated in black.

Q. And also marked old State dam?

A. Yes. That was part of the original canal system of the State. Coming up stream, it shows the Federal dam, which is indicated as the Federal dam, and also the building, designated as the proposed power station, and then in-

dicated in black as being the power plant of the Henry Ford and Son, Incorporated.

Q. Is there a gauge for recording the elevation of the water maintained at some point near that dam?

A. Yes. The lock is shown at the easterly extremity of the dam, and in that lock is the gauge by which the water surface elevations are obtained.

Q. That shows the elevation of the water above the Federal dam outside of the lock?

A. The upper gauge, there are two gauges in the lock. The lower gauge does not show the elevation of the water above the dam.

Q. The lower one shows the elevation of the water below the dam?

A. Yes.

Q. Proceed.

A. Then passing up the northerly sprout of the Mohawk——

Q. That is the sprout marked fourth branch of the Mohawk river?

A. Yes, sir. We come first to the junction of this fourth branch with the Erie division of the Barge canal and Lock 2, which is the entrance of the Barge canal.

Q. That is right at the left-hand end of the word Waterford printed on the map?

A. Yes, about three-quarters of an inch to the left.

Q. Is there a gauge maintained at that lock?

A. Yes. At this point we have indicated a gauge in black letters, the word gauge.

[fol. 87] Q. What is recorded on that gauge?

A. The elevations of the water surfaces at that point.

Q. That is below Lock 2?

A. Yes, sir.

Q. Now, right there, by whom is that gauge maintained and read?

A. That is maintained and read by the employees of the State Barge canal.

Q. And by whom is the gauge of the Federal dam maintained and read?

A. By the Federal employees and lock tenders.

Q. All right, go ahead.

A. Now, passing up the northerly sprout, or as indicated the fourth branch of the Mohawk, we come to the manufac-

turing plants of the plaintiffs. The first one going upstream, is that of the Little Falls Fibre Company. There we have indicated their buildings, including their powerhouse, their hydraulic development, and an indication of their tail race discharging into the fourth branch. Along the northeasterly bank of the river we have indicated by two black lines a canal which is marked in black Kings canal. Above the Little Falls Fibre Company we have the plant of the Asbestos Spinning and Weaving Corporation which is also indicated in black letters under that name. It shows the location of their building and the small head race leading into their plant, and the tail race back into the river. Further up we come to the plant of the Mohawk Paper Makers, Incorporated, and indicated in black, as such. It shows the various hydraulic development, and the head race and tail races leading from the Kings canal and discharging into the fourth branch of the Mohawk. Further up we have the entrance to this Kings canal from the river, the water being impounded by dams which are shown in black and indicated as dams: the water at this point being impounded and then diverted into the Kings canal through a head gate which I located at the northerly end of the dam.

[fol. 88] Q. Will you just indicate on here, the manner in which boats pass over the section in traveling to and fro?

A. Boats passing from points south through Troy, come through the channel up to the Federal lock at the east end of the Federal dam before mentioned, and northerly through the river to this junction point of the most northerly sprout of the Mohawk and Hudson. If the boat be bound further north, they pass up the Hudson river towards the right-hand side of the sheet, in the direction of a structure indicated as Lock No. 1.

Q. That is Lock No. 1 of the Champlain canal?

A. Yes.

Q. And boats bound west towards Buffalo?

A. They pass up the fourth branch or northerly sprout of the Mohawk and at the point indicated as Lock 2, enter the Erie division of the Barge canal for Buffalo.

Q. They go into the upland from the river?

A. Yes.

Q. And then they go through a flight of locks to the Crescent dam?

A. Yes, sir.

Q. I show you a map which has been marked Plaintiffs' Exhibit No. 3 for identification and ask you to tell us what is shown on that map?

A. This map is drawn on a scale of 200 feet to the inch, showing the various physical features of the vicinity of the plants of the plaintiffs with a special reference to the hydrographic features. It shows the northerly sprout of the Mohawk with the islands therein as far south as the northerly end of the State dam at Cohoes. It shows the properties of the plaintiffs, various property lines, the mills and buildings, the hydraulic development. It shows the Kings canal which has been mentioned before, and Kings dam, in general beginning at the upper left-hand portion of the map. The waters in the Mohawk river pass northerly [fol. 89] around these islands towards the dams of the plaintiffs.

Q. The water flows from the upper left-hand corner of the map to the lower right-hand corner, is that right?

A. Yes.

The Court: What do you mean by the word sprout?

A. Sprout or branch of the river.

Mr. O'Connor: Locally it has always been called sprout?

A. That may be a localism instead of the northerly branch or stream.

The Court: It is an interchangeable term?

A. Yes.

Mr. O'Connor: At the left of that is the State canal dam?

A. Yes, sir; constructed as part of the State canal system.

The Court: Where is that shown?

A. At the upper left-hand side. This one is at Cohoes so the boats can be brought across the river.

Mr. O'Connor: That is the old Champlain canal?

A. Yes, sir.

Q. And then the water passes over another dam which is tied to the land?

A. Yes, it is impounded by the dam.

Mr. Whalen: That dam the judge spoke to you about is the one you see from the railroad?

A. Yes, sir.

Mr. O'Connor: Then the water goes down to the Kings dam?

A. Yes, where it is impounded and part of it diverted to head gates into the Kings canal.

[fol. 90] Q. Explain why it is called Kings canal.

A. That was originally built by a resident of Waterford named King, John M. King.

Q. And this dam and canal have always been known as Kings dam and Kings canal?

A. Yes, sir.

Q. The water comes down and passes over that dam into the Kings canal?

A. And it passes down until it reaches the development of the Mohawk Paper Makers.

Q. There are a number of properties on here marked Frank Gilbert Paper Company, that is what is now the Mohawk Paper Makers?

A. Yes, sir.

Q. And some property marked the Waterford Knitting Company?

A. That now belongs to the Little Falls Fibre Company.

Q. This map was prepared in 1923?

A. Yes; this map shows conditions in 1923.

The Court: Are both properties marked Waterford Knitting Company, where in a similar way it goes through head

A. Yes, sir.

Q. What about George E. Smith?

A. He is still the owner of that building.

Q. But not involved in this action?

A. No, sir.

Mr. O'Connor: Tell us what happens to that water after it comes along the canal to the plant of the paper mill?

A. As it passes northeasterly down the canal it comes to the plant of the Mohawk Paper Makers, and it passes from the Kings canal through the head gates of the Mohawk Paper Makers and through Penstocks or flumes leading to their various water wheels where it develops power. Then it passes into tailraces, from which it is discharged back into the north sprout of the Mohawk and flows then northerly or northeasterly into the Hudson. Part of the river is thus used. Another part passes on northeasterly

[fol. 91] to the plant of the Asbestos Spinning and Weaving Company, where in a similar way it goes through head gates, flumes, through water wheels or turbines, through tailraces after the power has been developed, and then into the north sprout into the Hudson. Another part passes down to the powerhouse or hydraulic development of the Little Falls Fibre Company in a similar way, develops power by passing through the wheel by means of head gates and penstock and through the tailrace into the sprout and then on to the Hudson.

Q. That Kings canal continues at practically the same level throughout its length?

A. Yes, sir.

Q. And each one of these discharge their water into that north branch of the Mohawk?

A. Yes, they do.

Mr. O'Connor: I offer it in evidence.

Received and marked Plaintiffs' Exhibit No. 3.

Q. I show you a series of five photographs and which I ask to have marked in evidence.

Photographs marked Plaintiffs' Exhibits 4 to 8, inclusive.

Q. When were these photographs taken?

A. They were taken under my direction on September 24th, 1925.

Q. Now, I show you a photograph which has been marekd Plaintiffs' Exhibit No. 4, and ask you first in what direction was the camera faced?

A. The camera for that photograph was facing southwesterly.

Q. And facing up the Mohawk?

A. Yes, and up towards the entrance to the Barge canal.

Q. The water in that photograph is flowing towards the camera?

A. Yes, sir.

Q. From what point was it taken?

A. From a point near the Barge canal terminal along the [fol. 92] northerly bank of the north sprout at a point between Third and Fourth streets in Waterford.

Q. Go ahead and tell us what appears on that photograph?

A. In the foreground we have the entrance to the Barge canal and the northerly sprout of the Mohawk, the Barge canal being to the right and the northerly sprout to the left. At the extreme right of the picture we have Lock 2, which is the entrance to the western division or Erie division of the Barge canal, and the gauge which has been mentioned and indicated on another exhibit.

Q. Where did the old Champlain canal leave the river?

A. Just to the right of Lock 2—the structure marked Lock 2.

Q. That is what is known as the Waterford side cut?

A. Yes, consisting of a flight of locks from the northerly sprout up on to a higher level.

Q. Have you marked the location of the State water elevation gauge at Lock 2?

A. I have.

Q. And what is that shown on the left hand side of the photograph?

A. Looking up stream, the water flowing towards the point from which the picture was taken, we have indicated the plant and properties of the plaintiffs, the first one being the Little Falls Fibre Company with two buildings indicated, and the next, the one with the rather light colored roof, the Asbestos Spinning and Weaving Company, and next, rather indistinctly, the plant of the Mohawk Paper Makers, Incorporated.

Q. I show you Plaintiffs' Exhibit No. 5. Tell us what that shows?

A. That photograph is taken from a point on what is known as Peeble's Island in a westerly direction, looking across the northerly sprout of the Mohawk towards the plant of the Little Falls Fibre Company and the Asbestos [fol. 93] Spinning and Weaving Company. In this case the water shown in the foreground is flowing in the direction from the left-hand side of the picture to the right-hand side. The building indicated by the arrow is the power house of the Little Falls Fibre Company.

Q. That is the little low building in back of the photograph?

A. Yes, almost obscured by the other buildings in front of it.

Q. Does the tailrace from that plant appear on the photograph?

A. The structure which is over the tailrace appears but the tailrace is submerged. The location of it is indicated by the word tailrace in black ink.

Q. And that concrete is over the tailrace?

A. That is the bulkhead over the tailrace.

Q. Is the tailrace also indicated by arrows?

A. Yes; and that is plainly visible under the building indicated as the Asbestos Spinning and Weaving Company.

Q. That archway about in the center of the photograph, is that now used as a tailrace?

A. That was an old tailrace, the use of which has been abandoned.

The Court: Whose building is that?

The Witness: That belongs to the Mohawk Paper Makers. They use that building as a store house. It was formerly known as the old strawboard mill.

Q. And the power is now used by the plants up the stream?

A. Yes, sir.

Mr. O'Connor: I show you photograph marked No. 6, and ask you what is shown by that photograph?

A. That is taken from a point further upstream and taken in a westerly direction across the northerly sprout of the Mohawk which flows from the right-hand side of the [fol. 94] picture in the direction towards the right-hand side. It shows the plant of the Mohawk Paper Makers.

Q. That plant is the entire width of the picture nearly?

A. Practically, yes; and there is indicated the respective locations of the various tailraces of that company, two of them being partially visible, the two on the left, the other two being entirely submerged.

The Court: That has four tailraces?

A. They have four wheels and they should have a tailrace for each wheel; although the wheels in this case, on the right-hand side, they discharge in a common tailrace in the building.

Mr. O'Connor: The next, marked Plaintiffs' Exhibit No. 7, tell us what that shows?

A. That is taken from a point along the bank of the northerly sprout of the Mohawk just upstream from the southerly end of the mill, the Mohawk Paper Makers, in a southeasterly direction.

Q. That photograph is also looking upstream?

A. Yes, sir. In other words, the water is flowing over the dam as indicated, downstream in the direction of the camera. It shows on the left a concrete dam which is so indicated in black ink by an arrow. On the right it shows what is indicated as a wooden dam, and to the right of that and near the right-hand side of the picture it shows the head gates of the hydraulic development, known as Kings canal, the entrance to the canal.

The Court: Is that water running over into the wooden dam?

A. The water is running over the right-hand dam to the wooden dam, yes. It is running over all of the dam but the light strikes it in such a way that it is more apparent at that point than at other points. It is running over some of [fol. 95] the other parts of the wooden dam. It is rather indistinct.

Mr. O'Connor: On the right-hand side of the photograph there are sticks shooting up into the air?

A. Those are the stems of the gates which are raised and lowered to govern the admission of the water from the dam into the canal.

Q. And beyond that can you see the Himes mill that you refer to?

A. Yes, upstream.

Q. And the Himes dam?

A. Yes, sir. Just above the dam, indicated as a wooden dam, very close to the crest of it, you see a rather indistinct horizontal line which is the crest of the Himes dam.

Q. Now, Plaintiffs' Exhibit No. 8. What does that show?

A. That was taken from a point on the westerly bank of Kings canal in a northeasterly direction. It shows Kings canal which is indicated as a hydraulic canal in black ink, and which in this picture is flowing from the extreme lower

right-hand corner to the left, underneath the bridge and towards the plant of the Asbestos Spinning and Weaving Company and the Little Falls Fibre Company which are indicated.

Q. That is, flowing away from the camera?

A. Yes, away from the camera. In connection with the canal as it passes from right to left, there is apparent, the head gates of one of the developments of the Mohawk Paper Makers. These head gates, the stems of the gates themselves being visible and appearing almost directly under the word "Makers," in Mohawk Paper Makers—three upright stems. That is the entrance to one of the water wheels. Then as you pass further to the left there is another series of stems before you get to the end of a little bridge. These are little head gates at the entrance to another wheel. Just beyond the bridge to the left of the large [fol. 96] tree, there are other stems visible and these are those of the head gates to the two lower wheels of the Mohawk Paper Makers. Further to the left we have the plant of the Asbestos Spinning and Weaving Company, of which, practically, only is visible the roof. And further to the left the main building of the Little Falls Fibre Company, practically only the tower being visible.

Q. Have you examined the plants of these various plaintiffs and the hydraulic development in them?

A. Yes, I have.

Q. Will you describe the plant and hydraulic development of the Mohawk Paper Makers?

A. The Kings canal has already been mentioned and these tail and head races and head gates which we have just described, being shown in the last photograph. The wheel furtherest upstream is a 55-inch Crocker wheel.

Q. The first mill is a paper mill?

A. Yes.

Q. And that operates, that makes paper with two paper machines?

A. Yes.

Q. And the various equipment auxiliary to the paper machines?

A. Yes, sir.

Q. Will you describe the manner in which those wheels operate the various machines?

A. I believe I said the first wheel was a 55-inch Crocker. I would correct that. It is a 30-inch Sampson. The 30-inch Sampson operated the following: one 42-inch by 44-inch beater, one Jordan, one 4-inch by 6-inch triplex pump, boiler feed, one 4½-inch by 6-inch duplex boiler feed pump, one 6-inch single plunger pump which pumps stock for the 62-inch paper machine Jordan, one 4-inch fan pump which pumps stock for the 62-inch machine, one 4-inch auxiliary fan pump, one agitator for the stuff chest for the 62-inch machine and hoist.

The 55-inch Crocker operates one 45-inch by 48-inch beater, one 36-inch beater, one 42-inch by 44-inch beater, one [fol. 97] Jordan for the 72-inch paper machine, one 6-inch single plunger pump pumping stock to the 72-inch machine, one 4-inch pump pumps water to the tank, one 4-inch pump supplying beaters, one 3-inch plunger pump supplying water to both paper machines, one 2-inch Morris pump supplying water to filters for boiler feed purposes, one Jordan and 2 stuff chests.

The next wheel is a 35-inch Sampson turbine which operated two 42-inch by 42 inch beaters. It is possible since this information was gathered that another beater has been installed. One 4-inch pump. This is another 35-inch Sampson similar to the one just mentioned. It operates one generator, 125-volt 280 amperes at 725 rpm, four 3-horse power motors, one 7-horse power motor, one 3-inch by 4-inch triplex pump, being auxiliary boiler feed, one 2-inch Morris pump for the filter; operates and supplies current for the fans, cutter, air blast for the calendars, and the lighting circuits. That is all the equipment for the waterwheels.

Q. There are some auxiliary equipment other than this water power?

A. Yes.

Q. What is that?

A. The auxiliary power consists of one 14-inch by 14-inch vertical Pittsburgh steam engine. That is not strictly auxiliary. That operates the 72-inch paper machine. One 13½-inch by 13-inch Harrisburg steam engine operating the 62-inch paper machine, one 14 by 15 Harrisburg steam engine. That is auxiliary to the 30-inch Sampson turbine, one 14 by 36-inch Fishkill Corliss steam engine, auxiliary to the 55-inch Crocker turbine, one 14-inch by 36-inch Cor-

liss steam engine. That is auxiliary to either or both of the 25-inch Sampson turbines.

Q. In what manner is this auxiliary steam equipment connected with the water power equipment?

A. It is arranged so that in case of failure or insufficiency [fol. 98] of the water power that by means of quills and clutches the power from the steam engine can be put on the same shafting and operated with and together the power from the water wheels to supplement the power.

Q. The water wheels and engines work on the same shafting at the same time?

A. Yes.

Q. And the deficiency is made up by the steam power?

A. Yes.

Q. Describe the plant of the Asbestos Spinning and Weaving Company, the equipment there, the auxiliary equipment, if any?

A. The description of the turbine is given in your stipulation, and that turbine operates one picker, five sets of cards, being 2-card sets, one 120-spindle twister, nine looms, one cop winder of 10 or 12 spindles, one universal winder of 6 spindles, and an exhaust fan. The auxiliary power for the operation of this apparatus consists of one 35-horse power motor.

Q. Where do they get the power for that motor?

A. From the Cohoes Power and Light Company which has a line into their plant.

Q. Is that tied up with the water wheel shaft?

A. That is connected in such a way that both sources of power can be used simultaneously.

Q. That is, they both work on the same shafting?

A. Yes. They also have another motor which operates a twister and which is entirely independent of the water wheel.

Q. Now, will you describe the hydraulic equipment in the plant of the Little Falls Fibre Company?

A. They have a 45-inch Leffel turbine. They have at present no auxiliary power. They have a motor which can be used to drive their generator, but the physical connections were removed some time ago.

Q. In the case of the Little Falls Fibre Company, they convert this water power into electricity?

A. Yes.

[fol. 99] Q. And then carry it on wires over to their mill?

A. Transmitted by wires to the main mill.

Q. Since June 16th, 1925, what work has been done in the Little Falls Fibre Company mills?

A. It has been entirely remodeled and renovated for the manufacture of knit goods.

Q. It was prior to that time a knitting mill?

A. When the development was made it was planned for the manufacture of knit underwear.

Q. And the alterations have not yet been completed?

A. No.

Q. In the case of the Asbestos Company and the paper mill, the power from the water wheels is transmitted by mechanical means to the various machines?

A. Yes; by means of shafting and belting and gears.

Q. Will you tell us whether or not the same auxiliary equipment in the paper mill is sufficient to operate it without the water power?

A. Yes, sir.

Q. How about the Asbestos?

A. Their motor is sufficient to operate the plant without water power.

Q. During what period do these mills ordinarily work?

A. The number of hours?

Q. Yes.

A. The paper mill works on an average of twenty-two hours daily, six days in the week.

Q. And the Asbestos?

A. That ordinarily works fifty hours a week, days. During the summer of 1925 and the fall they were working also at night, various lengths of time, from fifty to sixty hours a week.

Q. How about the fibre mill?

A. The mill of the Little Falls Fibre Company was practically shut down. They were working on it, renovating it and getting it in shape for operation in these new processes.

Q. What is the operation of those mills when they start up?

[fol. 100] A. The Little Falls Fibre Company will operate twenty-four hours a day when it is finally in shape to operate.

Q. They have another mill further up this same branch of the Mohawk?

A. Yes. They have two other mills.

Q. Have you seen the dam and power plant of the defendant, Henry Ford & Son?

A. Yes.

Q. Have you seen flashboards on that dam?

A. Yes.

Q. Where is the power taken from defendant's power plant?

A. It is taken to the plant of the Ford Motor Company.

Q. Describe these flashboards that have been mentioned here?

A. They consist of planks secured to rods or pipes and held in an approximately vertical position by these rods slipping into recesses which were provided in the constructin of the dam on its crest.

Q. And how are those pipes set in the dam?

A. I have explained—they are set in pipes or openings that were provided when the dam was built.

Q. Little sockets?

A. Yes, in the crest of the dam.

Q. And how high is the top of the flashboards above the crest?

A. Approximately two feet.

Q. Now, have you the date when the State dam was built at Troy, called the old State canal dam?

A. I could give you the date, the year when it was completed. I don't believe anybody knows actually the date. It was completed in 1823, the lock and the dam.

Q. And that backed water to Waterford?

A. Yes.

Q. As a part of the old Champlain canal?

A. Yes, sir.

Q. Will you describe what was done in 1914 and 1915 in connection with that State dam?

A. In 1914 and 1915 upon the building of the new Federal dam the old State dam was removed.

[fol. 101] Q. Was the Federal dam built upstream or downstream from the old State dam?

A. It was built about 1,400 feet upstream or northerly, from the old State dam.

Q. And that was completed in 1915?

A. Yes, sir.

Q. Describe that dam briefly?

A. The old State dam?

Q. No, the new Federal dam.

A. The new Federal dam consists of a concrete dam across the river, the easterly end being approximately normal, or perpendicular to the general direction of the river, having a spillway crest of an elevation of 15.2 referred to Barge canal datum, and a length of about 586 feet. From the westerly end of this section which I have said is normal or perpendicular to the general course of the river, there is another section which runs southwesterly across the river and which is known as an auxiliary crest. It has a crest elevation of 17.2. It has a length of 669.2 feet and affords an easy passage for ice when the same collects. Beyond that comes the power bulkhead of the plant of the Henry Ford & Sons, the power plant.

Q. On what portion of this dam are the flashboards erected?

A. On the easterly portion, on the lower crest.

Q. Entirely across that lower crest?

A. Yes.

Q. So that the entire dam after the completion of those flashboards, the crest of it was at an elevation of 17.2 Barge canal datum?

A. Yes, sir.

Diagram marked Plaintiffs' Exhibit No. 9 for identification.

Q. I show you a diagram which is marked profile of Hudson and Mohawk rivers, and which has been marked Plaintiffs' Exhibit No. 9 for identification, and ask you to describe what that profile is?

[fol. 102] A. That shows the situation between the old State dam at Troy and Kings dam on the northerly sprout with respect especially to heights to elevation.

Q. Will you first tell us about the scale of this map, or this profile?

A. It has two scales, a horizontal scale of one inch equal to 2,000 feet, a vertical scale of one inch to four feet. This was done for the purpose of getting the entire map on a sheet of reasonable size. If the scales were not arranged in this way, to get it on a vertical size, I found the map would have to be a good many feet long.

Q. That would be about 500 feet long?

A. Yes, it would.

Q. Describe the various objects that are marked on this profile?

A. Starting at the right-hand side of the sheet at this dotted line which are indicated as variable tidal water, there being no other dam between the Hudson and the mouth of the Hudson river at this point at Troy, and the mouth of the Hudson is subject to tidal action, the amount ranging variously from one to five or six feet.

Q. That is the tidal variation?

A. Yes, sir.

Q. Now what is that marked sea level?

A. That is the datum that is used for the zero in giving elevations by the United States Engineers and by the United States Coast and Geological Survey.

Q. And that is zero for all elevations?

A. Yes.

Q. And zero for this profile is what?

A. It is the Barge canal datum.

Q. Used by the State Engineer?

A. Yes, sir.

Mr. O'Connor: In the stipulation we have agreed to do all our work on the basis of Barge canal datum, but there are a few things that have not been.

Q. What is the difference?

A. .87 of a foot. That is, having given elevations referred to datum mean sea level in order to get the corre- [fol. 103] sponding elevation referred to Barge canal datum there should be added .87 of one foot.

Q. That will give you Barge canal datum?

A. Yes. If the mean sea level of any object was 100 the Barge canal level of that object would be 100.87.

Q. Go ahead.

A. As we pass from the right-hand side to the left we come first to the old State dam which was built it 1823 and removed in 1915. The crest of the dam is shown at elevation 13.2, all elevations being Barge canal datum. Above the crest we have shown the flashboards which were occasionally used on this dam. They had an elevation of 15.2. They were approximately two feet high.

The Court: Who used those flashboards?

A. The State.

Mr. O'Connor: Did the Manning Paper Company use them too?

A. Yes, but they were on the State dam. The next shown is the new Federal dam and that is shown with the low crest being on the easterly portion, elevation 15.2, which was the same as the elevation of the flashboards on the old State dam. We also have shown above them the high crest, or the auxiliary crest, at an elevation of 17.2, which was the elevation of the top of the flashboards after they were put on. We also have indicated—this is the point where the gauge is located—the gauge giving the water surface elevations at the Federal dam. Above the Federal dam, further up, we have located approximately the junction of the Hudson river with the northerly sprout of the Mohawk, being a dotted line. Then next to the left we have the gauge of Lock 2 near the entrance—the one that has been indicated in the photograph. Then we pass upstream.

[fol. 104] Q. The bottom of the channel—tell us what that is?

A. The bottom of the channel they excavated for the Barge canal.

Q. Which runs as far as Lock 2?

A. Yes. Then passing up the northerly sprout of the Mohawk we come to the hydraulic development of the plaintiffs, and we have indicated there their draft tubes, and wheels, and their penstocks, leading into the Kings canal from whence the water is drawn, and we have shown the elevation of the water surface at Kings canal and we have shown the Kings dam, the crest of which is at elevation 30.

Mr. O'Connor: I offer that profile in evidence.

Received and marked Plaintiffs' Exhibit No. 9.

Q. Did you have some simultaneous gauge readings taken in this stretch of the river between the Federal dam and the paper mill?

A. Yes, I did.

Q. I show you two sheets, marked simultaneous gauge readings, taken by Mr. Weaver and his assistants, showing readings of October 1st, 1925, October 24th, 1925, and

October 26th, 1925, and ask you to describe how those readings were taken?

A. These readings on these various dates were taken by me and by men in my employ simultaneously, their watches having been adjusted so that the same time was read by each and they were taken over various periods. On October 1st, for instance, from 1 p. m. every fifteen minutes until 4.30 p. m., one man taking the readings at the Federal dam gauge, one at the gauge of Lock 2, and one at the gauge of the Mohawk Paper Makers. The same thing was done on October 24th for a period of a longer duration, from 10 o'clock till 4 o'clock in the afternoon on October 26th. Their readings were taken in like manner at 9 o'clock, 9.15 and 9.30, the river being in flood stage at that time.

[fol. 105] Q. Do those sheets show the elevation of the water at those points at the hours and days mentioned?

A. Yes, sir.

Mr. O'Connor: I offer those two sheets in evidence.

Received and marked Plaintiffs' Exhibit No. 10, consisting of two sheets.

Q. Did you also make a survey of the Water conditions on July 24th, 1925, in this vicinity?

A. Yes, I did.

Q. Now, I show you another profile and ask you what that profile shows?

Paper marked Plaintiffs' Exhibit No. 11 for identification.

A. This profile is a copy of the one that has just been described with the exception that we have indicated on it the conditions which were found by simultaneous readings and actual survey on the days of July 24 and October 1st, 1925.

Q. The first profile, marked Plaintiffs' Exhibit 9, had no water indicated on it between the Federal dam and the hydraulic plants of the plaintiffs?

A. No, it made no reference to water, whatever.

Q. This profile has lines on it indicating water conditions?

A. Indicating water surfaces.

Q. And those water surfaces are indicated by the red line?

A. Yes, sir.

Q. Now, tell us how you obtained the information from which you made up those red lines?

A. For the upper one on July 24th, 1925, all elevations shown on the left-hand portion of the main line, that red line, were determined by actual survey by me.

Q. Is that true of the elevations of the water in Kings canal that are marked in black?

A. I am speaking of all elevations marked in black. That [fol. 106] refers to any elevations that are shown there with the exception of the one at the right-hand end which is taken from the records of the State Engineer, that being 19.27, the elevations of the water surface at the Federal dam.

Q. Those black figures at the water surface at Kings canal, do those show the water surface on July 24th, or October 1st, 1925?

A. Our red lines shows all conditions on July 24th, 1925.

Q. I mean the figures on Kings canal?

A. Those figures have arrows upon the red line and they indicate conditions existing on that day, July 24th, 1925.

Q. Now, what does the lower red line show?

A. The conditions that existed on October 1, 1925. They were determined by the simultaneous readings which have been described.

Q. And which have been marked in evidence as Exhibit 10?

A. Yes, sir. We also have shown on these sheets the discharges on these respective dates.

Q. Is that separated between the Mohawk and Hudson river discharge?

A. Yes, sir.

Mr. O'Connor: I offer in evidence the profile marked Plaintiffs' Exhibit 11 for identification.

Received.

Paper marked Plaintiffs' Exhibit 12 for identification.

Q. I show you the profile which has been marked Plaintiffs' Exhibit 12 for identification and ask you what is shown on that profile?

A. This profile shows in a similar manner to that marked Exhibit No. 11, the conditions which obtained as regards water surface and river discharge, on October 26, 1925, it being the upper red line and set of black figures, and on October 24, 1925, being the lower red line and figures in connection with it.

[fol. 107] Q. Where did you obtain the elevations that are shown by that red line?

A. They were obtained in the same manner that we obtained those for the profile Exhibit 11, by simultaneous readings.

Q. That is the readings which have been offered in evidence as Plaintiffs' Exhibit No. 10?

A. Yes, sir.

Mr. O'Connor: I offer that profile in evidence.

Received and marked Plaintiffs' Exhibit No. 12.

Mr. O'Connor: I offer in evidence the blue print showing mean daily elevation of water surfaces of the Hudson river above the Federal dam at Troy, N. Y., for the year 1925, obtained from the office of the State Engineer and Surveyor.

Received and marked Plaintiffs' Exhibit No. 13.

Mr. O'Connor: I also offer in evidence blue print showing mean daily elevation of water surface of the Mohawk river below Lock No. 2 at Waterford, N. Y., for the year 1925, also obtained from the office of the State Engineer and Surveyor.

Received and marked Plaintiffs' Exhibit No. 14.

Q. Mr. Weaver, the readings or the elevations shown on Plaintiffs' Exhibit No. 13, were taken at this gauge, which you have referred to at the upstream end of the Federal lock at Troy?

A. Yes, sir.

Q. And the elevations appearing on Plaintiffs' Exhibit No. 14 were taken at this gauge which you have referred to as being located on the downstream side of Lock No. 2, Erie canal?

A. Yes, sir.

Q. I show you a sheet marked comparison of monthly average water elevation Federal dam, Troy, and Lock No.

2, Waterford, for the year 1925 and ask you to explain that sheet?

A. The data on this sheet is obtained from blue prints [fol. 108] which have been offered in evidence, being the readings or figures for the respective months, being the average of the figures or elevations as shown on those blue prints. We have shown them each month at Troy and at Waterford, and at the right we have shown a column of the difference between the elevations.

Q. That is expressed in terms of feet?

A. Yes. At the bottom we have shown an average for the entire year.

Mr. O'Connor: I offer that sheet in evidence.

Received and marked Plaintiffs' Exhibit No. 15.

Q. I show you one more profile which is marked Plaintiffs' Exhibit No. 16 for identification, and ask you what is indicated by that profile?

A. On this profile, which is similar to the others in a general nature, we have shown the water surfaces at various elevations of 15.2, 16.2, 17.2 and 18.2.

Q. The water surfaces are indicated by the red line?

A. Yes, sir.

Q. And how did you obtain those water surfaces?

A. Those water surfaces were obtained by scaling on the map from 15.2, 16.2, 17.2 and 18.2 along the surface of the pool.

Q. What conditions do they show, the conditions on a particular day?

A. No, they show conditions on any day when the water was at that particular height.

Q. Your determination as to what the water would be?

A. Yes.

Mr. O'Connor: I offer that in evidence.

Received and marked Plaintiffs' Exhibit No. 16.

Q. Will you tell us what you found regarding the level of the water between the Federal dam at Troy and the [fol. 109] mills and tailraces of the plaintiffs, as a result of the studies which have been recorded on the exhibits marked in evidence?

A. As a result of those studies, of the official records of the simultaneous readings and actual surveys together with the discharges of the river, I found—

Mr. Whalen: Are these from exhibits that are already in evidence?

The Witness: Yes. I find that except during freshets or flood flows the elevation of the water surface at Troy is substantially the same as the water surface at the plants of the plaintiffs.

Mr. O'Connor: What is the condition in floods or freshets?

A. In floods or any other large discharges the water surfaces at Waterford and at the plants of the plaintiffs are somewhat higher than the water surfaces at Troy at the Federal dam.

Q. And what is the reason for that condition?

A. If a large volume of water be discharged, it is necessary for some slope in order that it may have velocity to move.

Q. What do you find to be the effect of raising the elevation of the water at Troy with reference to the elevation of the water at plaintiffs' plants?

A. Any raising of the water in elevation of the water at the Troy dam results in a corresponding rise of the water surface at the plants of the plaintiffs.

Q. What is the effect on the plaintiffs' hydraulic plants and power if the water at its tailraces or plant is raised?

A. Any increase in the height of the water or any raising of the water surface in the tailrace or tailraces of the plaintiffs diminishes the effective head operating on the turbines of the plaintiffs. That is, the column of water which is forcing their water wheels to turn is of a smaller height. [fol. 110] Q. And what effect does that have on the power available?

A. The decrease in the effective head decreases the amount of power available on the turbine shafts in direct proportion.

Q. Then tell us what is the effect on the power of the plaintiffs in their plants which you have described resulting from an increase in the elevation of the water at the Troy dam?

A. Any increase in the elevation of the water at the Troy dam causes a reduction in the available power of the wheels of the plaintiffs.

Q. Tell us whether or not the placing of these flashboards on the crest of the Troy dam does increase the elevation of the water at that point?

A. Yes, it does.

Q. Have you arrived at some determination as to the amount of power lost by the plaintiffs' power plants, as the result of the placing of these flashboards on the Troy dam?

A. Yes, I have.

Q. What is that?

A. Expressed as a percentage it varies for various discharges of the river. With no discharge over the crest of the flashboards, or, in other words, when the Ford power house is using the entire flow of the river and the water is at the elevation of the crest of the flashboards, the increase in the height at Waterford is two feet. With increased flows in the river, so that some of the water has to be passed over the spillway, or over the tops of the flashboards, the increase at Waterford is less until finally in very high flows the increase is about 1 foot.

Q. Now, what is the elevation of the water in the Kings canal, the canal of the plaintiffs here?

A. It usually is 29.6 or 7; sometimes 5. It depends upon how much water is being drawn through it.

Q. And it is usually kept at or about that elevation?

A. Yes, it is usually kept very constant.

[fol. 111] Q. Can it be raised any higher?

A. Not without endangering the banks of the canal.

Q. You started to tell us what percentage of loss of power there was as a result of these flashboards?

A. As a result of a decrease in the head, effective or operating head, the loss in power expressed as a percentage varies from 9 to 14 per cent.

Q. Will you tell us what the ordinary purpose of these flashboards is in the operation of power plants?

A. Ordinarily flashboards are put on where, or for one or two purposes, or possibly a combination of them. The first is to increase the head, the second is to provide storage; and a combination of the two, of course, would be to increase the head and provide storage.

Q. Will you just briefly describe how those flashboards are operated in connection with the power plant—how they do increase the head, or how they do provide storage?

A. If the natural surface of the water is at the crest of the dam and two feet height is added to that dam by means of flashboards why the head operating on the wheels is increased by two feet.

Q. And the power available in the power plant is increased?

A. Increased proportionately for the same use of water?

Q. Tell about the use of flashboards for storage or pondage?

A. In that case the water is stored during certain hours when there is a smaller demand than ordinarily is drawn out and drawn down through the wheels; and is used when the demand is greater than the amount of water that is flowing into that pond or pool.

Q. That is stored during the period of light load and used during the period of heavy load?

A. Yes.

Q. Is there present, in connection with the operation of the defendant's plant, some variation in head resulting [fol. 112] from conditions below the dam?

A. Yes, there is a variation due to the rise and the fall of the tide which makes a difference in the height of the tail water in the tailraces of that plant.

Q. So that the effective head on the defendant's hydraulic equipment varies with that tidal variation?

A. Yes, sir.

Q. And what is the range of that tide?

A. From one to five or six feet, in extreme.

Mr. O'Connor: I offer in evidence a letter from the defendant to the United States Engineer's office, Albany, N. Y., dated September 22, 1924, including the two blue prints attached thereto marked location of the Federal dam at Henry Ford & Son's motor plant, Green Island, N. Y.; and second one, marked Flashboard details Federal dam at Henry Ford & Son's motor plant, Green Island.

Received and marked Plaintiffs' Exhibit 17-A and 17-B.

Mr. O'Connor: I also offer in evidence a letter from the War Department, United States Engineer's office, New

York city, dated January 12, 1925, and addressed to the Ford Motor Company, Green Island, N. Y.

Received and marked Plaintiffs' Exhibit No. 18.

Q. Will you put on the record the date when those flashboards were on and off?

A. They were first installed on June 16, 1925. They remained intact until July 23 when they partially failed, water at elevation 18.9. They were reinstalled on August 25th, and remained intact until September 14th, when they partially failed again at the same elevation of water 18.9. They never were put back; and under high water condi-[fol. 113] tions on October 25th and 26th, they practically failed completely—that is to the point where they had very little effect. They still remained there and possibly raised the water a very small amount. On December 2nd, they were entirely gone.

Cross-examination by Mr. Whalen:

Q. Referring to Plaintiffs' Exhibit 2, by reference to the scale indicated on that blue print, please tell us about how far it is from the Federal dam to the lowest of the three plaintiffs' plants?

A. About 15,000 feet.

The Court: That would be the Little Falls Fibre Company?

Mr. Whalen: Yes, sir.

Q. At the time that Plaintiffs' Exhibits 4 to 8, inclusive, were taken, which are the five photographs that you identified, I understand you that that was after the flashboards had partially failed?

A. Yes, sir; the photographs were taken on September 24th, and they partially failed the second time on September 14th.

Q. You told Mr. O'Connor about certain holes placed in the easterly crest of the dam at the time of its construction. Of what material were those holes—were they concrete?

A. The crest of the dam is constructed of concrete and these are sockets or holes in the concrete.

Q. Were they themselves made of concrete?

A. There may be a pipe there to act as a form and make the hole.

Q. Do they consist of a series of what you might describe as rings, straight across?

A. They are a series of holes right across the top of the crest of the dam.

[fol. 114] Q. That is, open holes. What purpose do they serve?

A. They were put there for the possible construction of flashboards and support. To hold flashboards.

Q. And put there when the dam was built?

A. Yes, sir.

Q. Are you familiar with the tailrace at the defendant's plant?

A. Yes, more or less.

Q. Can you give us its length?

A. No, I cannot.

Q. At the time of the profile of the conditions on July 24th, 1925, the time to which that relates, that would be Exhibit No. 11, the flashboards were not in position then, were they, on July 24th?

A. No, sir.

Q. In connection with the Plaintiffs' Exhibit 12, I call your attention to the figures immediately above the scale No. 18, and at the right where there appears by an 0, 18.21, at the Federal dam, is that what that means, that that was the height of the water on that occasion?

A. Yes, sir.

Q. And 18.16 at the gauge at Lock No. 2 at the entrance to the Erie canal?

A. Yes.

Q. Does that indicate that the water was higher by .05 of a foot at the Federal dam than it was at the gauge of Lock 2?

A. No, that indicates that the readings at the Federal dam could not be taken so closely as they could at the gauge at Lock 2.

Q. As a matter of fact, these figures if taken by themselves involve the water sloping back uphill?

A. They would indicate that the water ran up hill.

Mr. O'Connor: By how much?

A. By .05 of a foot. That is five eighths of an inch approximately.

Mr. Whalen: Referring to Plaintiffs' Exhibit 12, that shows, does it not, that the flow on October 26th last was [fol. 115] considerably higher than the flow on October 24th, two days earlier?

A. Yes, sir.

Q. Due to what?

A. Due to an increase in discharge in the Mohawk river, flood conditions.

Q. Of course, it necessarily followed a decrease in the head at the plants of the plaintiffs.

A. Yes, sir.

Q. If higher water conditions existed?

A. Yes, sir.

Q. And irrespective of any flashboards on the Troy dam?

A. Any increase in the height of the water would cause a loss of head at the plants of the plaintiffs.

Q. Without regard to flashboards on the Troy dam, if there were these flood conditions there would be necessarily more or less loss of head at the plaintiffs' plants?

A. Yes.

Q. Have you made any sketch or drawing showing the slope of the so-called pond above the Troy dam, from time to time?

A. The slope of the pond?

Q. Yes.

A. The water surface in the pond?

Q. Yes.

A. These different exhibits show the height of the water and therefore the slope.

Q. Take, for example, Plaintiffs' Exhibit 16; the three horizontal red lines show the height of the water at the Troy dam and in the Mohawk near the plaintiffs' plants as being substantially the same, do they not?

A. Yes, sir.

Q. Ought not the height of the water in the Mohawk to be higher?

A. Not that amount that we could see very well on the scale. They are substantially the same.

Q. There is enough difference so the water would pursue its natural tendency to run down hill?

A. Yes.

Q. Does that variation make any difference in the flow?

A. Yes.

[fol. 116] Q. To what extent?

A. If you let me have those exhibits I will give you the various flows and discharges that are given on that and tell you the slope in each case. On Exhibit 11, July 24th, with a discharge of 17,800 per second feet, the slope between the gauge at Lock 2 and the gauge at the Federal dam was .03 of a foot, practically three-eighths of an inch. From the gauge at Lock 2 upstream to the plants of the plaintiffs the gauge was .13 of a foot, practically an inch and three-fourths; and that was determined by actual levels run on those days. That is for that particular flow.

Q. Referring again to Plaintiffs' 16 and particularly to the four horizontal red lines thereon—you do not want the court to understand that the water elevations at the Federal dam and at the point in question on the fourth sprout of the Mohawk are exactly the same?

A. Not exactly the same. My conclusion was that the slope was negligible up to elevations and flows of that amount.

Q. To what extent is it a correct graphic representation of the relative conditions of the water at those two points?

A. Why, yes.

Q. Have you made any readings or taken any table ratings, showing the conditions of the water at the time when there were no flashboards on the dam, between the period of June 16th, and December 2nd, last?

A. When there were no flashboards?

Q. Yes.

A. There wasn't any time between those dates when there were no flashboards on the dam.

Q. There was a time when the flashboards were practically down and not operating, were there not?

A. After October 26th, they were practically down; but they were still backing water to some extent however slight.

[fol. 117] Q. Have you made any such readings or prepared any such tables with reference to the water level conditions when the flashboards were entirely in place at one end of the easterly course to the other?

A. As regards these simultaneous readings?

Q. Yes.

A. I never took any except on these particular days that are shown here.

Q. Do you recognize the picture which I show you as one taken from the defendant's power house on the west side of the Hudson river, the camera being pointed in a north and northwesterly direction and showing the apron of the Troy dam?

A. Northerly and northeasterly direction?

Q. Yes.

A. Yes, I recognize that.

Q. The main or easterly spillway being indicated by the letter E?

A. Yes.

Q. And the auxiliary or westerly by the letter W?

A. Yes.

Q. The flashboards were installed upon the crest marked E?

A. Yes.

Mr. Whalen: I offer it in evidence.

Received and marked Defendant's Exhibit No. 1.

Q. Do you recognize the picture I now show you as taken from the west bank of the Hudson north of the defendant's power house with the camera pointed east and showing the pool—so-called pool, of the Troy dam?

A. Yes, sir.

Q. And the respective crests marked E and W, as you testified with respect to the last exhibit?

A. Yes, sir.

Mr. Whalen: I offer that in evidence.

Received and marked Defendant's Exhibit No. 2.

[fol. 118] Q. Do you recognize the picture I now show as having been taken from about the same point as that, where the camera was located with respect to the last Exhibit No. 2, but the camera pointed south and showing to the right the defendant's power house?

A. Yes, from some point in that location.

Q. Defendant's power house appears at the right?

A. Yes, sir.

Q. And at the left, below the dam, does the river appear?

A. Yes, sir.

Q. The respective crests are likewise marked E and W?

A. Yes, sir.

Mr. Whalen: I offer it in evidence.

Received and marked Defendant's Exhibit No. 3.

Q. Do you recognize that as having been taken from the east or Troy side of the river with the camera pointed in a northwesterly direction?

A. Yes, sir.

Q. The crest similarly marked?

A. Yes, sir.

Mr. Whalen: I offer it in evidence.

Received and marked Defendant's Exhibit No. 4.

Q. Does the picture I now show you give a good representation of the flashboards in question in erect position?

A. Yes. It is a good picture showing the action of them.

Q. It gives a good idea of the situation on the main spillway where the flashboards are?

A. Yes, sir.

Mr. Whalen: I offer it in evidence.

Received and marked Defendant's Exhibit No. 5.

Q. Have you made an estimate, Mr. Weaver, of the average amount of backwater at the plaintiffs' plants caused by the installation of the flashboards?

A. No, sir, I have not.

[fol. 119] Q. Don't you think that would be helpful and instructive in this case?

A. Why, possibly.

Q. You engineers have occasion in connection with river conditions to make use of the term backwater?

A. Yes, sir.

Q. And that term means what?

A. It means the flooding back upstream when certain obstructions or conditions are imposed downstream.

Q. As I understand from the time the dam was completed in 1915 until the defendant occupied the power site in 1923, there was no use whatever made of the water for power purposes at that dam, was there?

A. No, sir.

Q. Then from 1915 when the dam was completed until the defendant occupied the site in 1923, the tail water elevation at the plaintiffs' plants was controlled, was it not, by the

fact that all the discharge in the river was passing over the Troy dam except what went through the locks?

A. Yes, sir.

Q. After the defendant's plant was completed in 1923 down to the time that flashboards were installed in June, 1925, I presume that a considerable portion of the flow from the river passed through the power station?

A. Yes, some of it.

Q. What effect did that have on the level of the pond above the dam?

A. In what particular respect?

Q. Did it lower the level of the pond, decrease the level of the pond?

A. From what?

Q. The fact that water was passing through the power house?

A. Did it decrease it from what level?

Q. Of whatever level was existing before the water started to go through the power station?

A. The fact that the power station was operating would it decrease or lower the water above the dam from where it would be if there were no power station there?

[fol. 120] Q. Yes.

A. Yes, to some extent.

Q. Would it be in proportion to the amount of water that went through the power station?

A. No.

Q. Why do you say that?

A. Because it is dependent largely upon the discharge in the river itself.

Q. Given a certain discharge or flow through the river of which a certain amount passed through the power station, wouldn't that tend to draw down the pond level in proportion?

A. Yes; but I understood you to say in proportion to the amount of water that went through the station.

Q. If not directly in proportion, how much in proportion?

A. In varying amounts, depending upon the discharge of the river. There might be a discharge of the river when the flow through the station would be negligible and it would have no effect at all.

Q. What conditions would bring about that?

A. A flood or a freshet.

Q. Unusual conditions?

A. Yes, sir.

Q. When the water was diverted through the power station thereby decreasing the pond level so that the effect would be to decrease the tail water elevation at the plant?

A. Yes, sir.

Q. And that gave the plaintiff's plants a better head?

A. Than when they started diverting the water through the power station?

A. Yes; but a much smaller head than before the Federal dam was built.

Q. I am talking about the conditions that existed at the power plant after completion of the power plant but before the installation of the flashboards.

A. Yes, sir.

Q. Then, isn't it a fact, Mr. Weaver, that from the time the defendant's plant commenced to operate in 1923, down to the time that the flashboards were installed in June, 1925, [fol. 121] these plaintiffs had better head conditions than they had before the power plant was in operation?

A. To some degree, yes, before the plant was in operation but subsequent to the time that the Federal dam was built.

Q. I am talking about the time that the defendant's power plant commenced to operate, and your answer was yes?

A. Yes, to that period.

The Court: That is, before the installation of the flashboards, is that what you mean?

A. I mean to say there was some benefit due to the operation of the plant and the carrying of the water through the wheels after the plant was constructed there, the condition that prevailed after the construction of the Federal dam.

Mr. Whalen: Between 1915 and 1923?

A. Yes.

Q. Referring to the stipulation, which is Plaintiffs' Exhibit 1, if you will turn to the first exhibit following the signed page, the exhibit being entitled "preliminary rating table with Troy dam"—do you see it?

A. Yes.

Q. These figures relate to the discharge of the river at the main spillway?

A. They relate to the discharge of the river at both spillways.

Q. But when there are no flashboards on the main spillway?

A. Yes, sir.

Q. Now, take the pond level shown by the gauge height to be 17.2, which is the fourth figure from the end on the lower left-hand corner——?

A. Yes.

Q. With the pond level at that figure, 17.2, what was the discharge over the main crest in cubic feet per second?

A. 5,000.

Q. But no discharge over the western or auxiliary crest?

A. No, sir.

[fol. 122] Q. Now, taking that 5,000 cubic feet per second——?

A. After the water rises to a certain height, both spillways come into play. From 15.2 to 17.2, only the main spillway is in operation.

Q. Bearing in mind that the average daily flow of 5,000 cubic feet per second—by the way you always call that 5,000 second feet?

A. Yes, sir.

Q. That the average daily flow coming down the river—can you give us the pond level without any water passing through the power plant, according to this table?

A. The average daily flow, I haven't heard that expression before. I haven't mentioned any average daily flow.

Q. I have not asked you to refer to any computation of an average daily flow, but I am asking you to assume an average daily flow of 5,000 second feet, with no water passing through the power plant and no flashboards on the dam, what would be the pond elevation, according to this table?

A. 17.2.

Q. Now, assuming that same average daily flow, 5,000 second feet, coming down the river, and the same amount used by the power plant, there being no flashboards on the dam, what would be the pond elevation then?

A. 15.2.

Q. That means a two-foot gain, does it not?

A. That makes a difference of two feet in the surface of the water above the dam. In one case 15.2, and the other case 17.2.

Q. It pulls down the pond level two feet?

A. It decreases the surface of the water two feet.

Q. By passing the water through the defendant's plant?

A. Yes, sir.

The Court: That is, the operation of the defendant's plant, without the maintenance of flashboards, would decrease the flow of that two feet?

[fol. 123] A. Under that particular condition of flow. May I explain this?

Mr. Whalen: We are assuming all the time this 5,000 second feet, being the average daily flow.

The Court: I am taking that as a basis.

The Witness: The capacity of this lower spillway or the one we have been calling the main spillway, with a height of two feet of water over it, is 5,000 cubic feet per second. Therefore, if we take that same quantity flowing in the river, that is the normal flow in the river, instead of passing it through the spillway, we pass it through the wheels of the defendant's plant, that leaves no water to go over the spillway, and, therefore, the surface of the water is level with the crest.

Mr. Whalen: So that the discharge under the conditions that you just mentioned, of 5,000 second feet, through the defendant's plant, also benefits the plaintiffs' tail water conditions, does it not?

A. In the same hypothetical sense, yes.

Q. In the same proportion?

A. In the sense on these assumptions.

Q. Now, taking again our average daily flow of 5,000 second feet, coming down the river, and the elevation of the pond at the beginning of the day at 17.2, the flashboards being installed on the dam, would there be any change in that pond level as a result of the diversion of the 5,000 second feet through the power plant?

A. As long as that condition continues there is no change in the surface of the water; it remains at 17.2.

Q. If that be so, then there is actually no difference in the pond elevation of this dam between the condition of 5,000 second feet flowing over the dam without flashboards, [fol. 124] but no water passing through the station, and the 5,000 second feet flowing through the plant with flashboards on the dam, is there?

A. No. On the supposition that you got 5,000, and you can suppose the plant is using 5,000 through the day, and that the flow is constant through the day and that there will be no change therein, why the answer is no.

Q. Would you mind giving me the benefit of your opinion on this; assume that the power plant uses an average of about 4,800 second feet a day, the two-foot flashboards installed on the dam, 5,000 cubic feet a second coming down the river into the pond, with this elevation of 17.2 feet at the beginning of the day, can you tell me what would be the resulting level in the pond?

A. You mean 200 second feet of water passing over the flashboards—that is substantially it. I can say that something less than .5 of a foot would require some calculation to tell what the increase of height would be.

Q. That is the increased height?

A. The amount of water going over the flashboards, 5,000 second feet coming down the river, and the plant using 4,800, leaving 200 going over the flashboards, and the auxiliary crest—part of it would go over each.

Q. Have you any data which would enable you to calculate that amount passing over the top of the flashboards and auxiliary crest?

A. Without calculating it, I would not attempt to guess at it.

Q. Do you think it would be less than half a foot?

A. Yes, I know that.

Q. Whatever it was, would be small?

A. Yes.

Q. Would it be any greater at plaintiffs' plants under those conditions?

A. No; it would be substantially the same.

[fol. 125] Q. If there were not any flashboards installed, it would be true, wouldn't it, that with 4,800 second feet used through the station you would obtain the same pond level when 9,600 second feet were coming down the river?

A. With 4,800 second feet going through the plant, without flashboards, the water would be just below the crest of the dam. Now with 9,600, that would require some calculation.

Q. With 9,600 second feet, 4,800 going through the plant and 4,800 going over the main crest?

A. Without flashboards?

Q. Yes.

A. Then it would be slightly under the 17.2.

Q. Whatever it is, it would be just the same as when there were 4,800 going through the station, the elevation 17.2.

A. The elevation 17.2 would allow a flow of 4,800 second feet through the plant and 4,800 second feet, approximately, over the main spillway.

Q. Making a total of about 9,600?

A. Yes, sir.

Q. The elevation of the pond would be the same, 17.2?

A. I think it would be slightly less than 17.2.

Q. Due to the difference between 5,000 and 4,800?

A. Yes, sir.

Q. The depression of two feet, existing across the top of the main crest between the east shore and the auxiliary spillway, you engineers call the notch, don't you, that drop of two feet?

A. Yes.

Q. Can you give us the capacity of that notch in cubic feet per second?

A. Of the main spillway?

Q. Yes.

A. 5,000 second feet at a height of 17.2.

Q. Does it make any difference in the elevation of the pool whether that 5,000 cubic feet a second goes through this notch without any flashboards on it and nothing going through the power plant, or whether two foot flashboards were put on that main spillway or not, the same amount [fol. 126] of water passing through the power station?

A. Providing that is the total amount of water flowing in the river.

Q. Providing, assuming, that that is the capacity of the notch, 17.2, is what we are talking about, wouldn't it be so?

A. Yes, if we are assuming that we only have 5,000 second feet.

Q. Take any amount of water, 5,000 cubic feet a second, or more or less, whatever is the given volume of water, does it make any difference in the elevation of the pool whether that amount of water goes through the notch without flashboards and nothing going through the power plant, or whether these two-foot flashboards are put on the main spillway and the same amount of water goes through the power station?

A. No, it does not.

Q. So that the conditions in the river above the dam, which we call the pond, on a given day would be no different whether the amount of water discharged on that day was allowed to go over the main spillway or through the power station?

A. No, sir.

Mr. O'Connor: Under what conditions?

The Witness: All my answers on this imaginary flow of 5,000 which Mr. Whalen assumed in the first place and they are all based on nothing else.

Mr. Whalen: The question which I asked you last, but one, related to any volume of water, 5,000 cubic feet a second or a greater volume or a less volume, and your answer was, that whether that given volume went over the main spillway without flashboards, no water passing through the plant, or whether the two-foot flashboards were put on the main spillway, and the same amount of water went through the station, made no difference?

[fol. 127] A. Not if all the water goes through. As long as you take it through the power plant it doesn't make any difference.

Q. Suppose 5,000 cubic second feet?

A. Then it hasn't changed it. The elevation would be the same, whether the water goes through the power plant or through the notch.

Q. If the defendant's plant was closed, and water is allowed to pass over the dam without any flashboards, would the conditions in the pool above the dam be the same as they were before the defendant's plant was built, but after the construction of the Federal dam?

A. Yes, sir.

Q. During the past few years, has there ever been a time when there was no water wasting over the plaintiff's dam?

A. I couldn't say as to that.

Q. Almost continuously there is water wasting over that dam?

A. No, I wouldn't say so. Certain times of year there is considerable water going over it, and other times the pool is drawn down but kept up to 15.2 for navigation purposes.

Q. I am talking about the plaintiff's dam.

A. No; there are times in the summer when the water is below the crest of that dam.

Q. It doesn't occur very often?

A. It occurs practically every summer.

Q. If that occurs that would lower the head in the canal?

A. Yes, when that occurs there is a decrease in the head.

Q. Do you recall stating to Mr. Wood, the defendant's engineer, in an interview when you and Mr. O'Connor were talking with Mr. Wood, that there was only one day in the past two years and that was on Sunday, when there was no flow of water whatever over the plaintiff's dam?

A. No, I do not.

[fol. 128] Q. Whatever is the fact about your recollection, as a general rule there is water wasting over the top of the plaintiff's dam, take it year in and year out?

A. As a general rule, at certain times, there is water wasting over it; but in other times of the year there is no water wasting over it.

Q. When you do have water wasting over it, is that due to a better run of water in the Mohawk river than you used to have?

A. Due partially to any change in the amount of rain, or whether or not the plants on the King canal are being operated. In other words, on Sunday if they be shut down, naturally the water will go over those dams.

Q. With the water wasting over plaintiff's dam, the tail water level at plaintiff's plants would be higher than it would be if there were no water going over plaintiff's dam, wouldn't it?

A. It might and it might not; depends upon other conditions, depends on what other plants were doing.

Q. But you would often have that condition, water wasting over the dam, you would have a higher tail level than

if there were no water going over the top of plaintiffs' dam?

A. It might make some little difference.

Q. It would be bound to make a difference, some difference?

A. Some difference, yes.

Q. And that is true no matter what the conditions are at the Green Island dam, isn't that so?

A. Yes, sir.

Q. Do you know where the so-called Delta and Hinckley resevoirs are located?

A. In a general way, yes.

Q. Their waters leave the upper waters by the Mohawk river, don't they?

A. Yes, sir.

Q. Would you ascribe any of the wasting water over plaintiffs' dam to the release of greater amounts of water [fol. 129] from the Hinckley and Delta reservoirs than there used to be?

A. Why, possibly so. I think it is quite remote.

Q. Now, if the wasting of water over the top of plaintiffs' dam raises the plaintiffs' tail-water why, that loss of power comes from an increase in the flow of the Mohawk to that extent?

A. Yes, to a small extent.

Q. Can you tell us, have you made inquiries or ascertained what was the average amount of water that passed through the defendant's plant during the years 1924 and 1925?

A. No, sir.

Q. What would be a proper method of computing that?

A. It could be computed by the records in the power-house.

Q. That is making direct calculations at the power-house?

A. Yes, sir.

Q. By using what they call output curves?

A. Yes, sir.

Q. Depending upon the actual amount of power developed at the defendant's plant?

A. Yes, and other factors.

Q. Have you made any computations of the amount of water which passed through the defendant's power station

for any particular days in the months of June, July, August or September of last year?

A. Only the ones mentioned in this stipulation. I agreed that they were correct—June, July, August and September.

Q. That is what paragraph of the stipulation, to identify it?

A. 7—stream flow.

Q. Headed, average flow at Troy dam?

A. Yes, sir.

Q. Just preceding paragraph 8?

A. Yes.

Q. Would you say that the table, which shows approximately the same amount of flows for those days when flashboards were on the dam, is accurate?

A. Approximately so, yes.

[fol. 130] Q. I understood you that you had not made any estimate of the average amount of backwater at the plaintiffs' plants, caused by the installation of the flashboards at the Green Island plant?

A. No, sir, I have not.

Q. You told Mr. O'Connor that you estimated the loss of power, that you estimated from 9 to 14 per cent the loss of power at the plaintiffs' plants because of the presence of flashboards at Green Island?

A. I said that that would be the loss of head.

Q. And consequent loss of power due to increase in the height of water at the Federal dam?

A. Yes, sir, ranging from one to two feet.

Q. Without any estimate of the average amount of backwater at plaintiffs' plants caused by the installation of flashboards at the Green Island plant, how do you reach those figures of 9 to 14 per cent?

A. An increase in the elevation at Waterford at the plaintiffs' tailrace of two feet, diminishes their head, two feet, which is a certain percentage of the total head and which is a certain percentage of the power which has been lost without regard to the actual amount of power.

Q. You are assuming a reduction of two feet all the time?

A. No, varying from one to two feet.

Q. Have you computed the loss in energy in these plants?

A. Due to what?

Q. To the presence of flashboards on the Green Island dam?

A. No, sir.

Q. To compute that you would have to be in possession of the tables showing the various flows, would you not, different elevations?

A. I would have to be in possession of the amount of loss of head.

The Court: We will take an adjournment until 3 o'clock this afternoon.

[fol. 131] Afternoon Session

CHARLES J. WEAVER, recalled for further cross-examination by Mr. Whalen:

Q. You testified concerning a loss of power that you expressed as between 9 and 14 per cent?

A. Yes, due to an increase in the height of the water or decrease in the head.

Q. Did you apportion that estimate over any particular period of time?

A. That would occur during any time when the head of these wheels had been decreased by the flashboards.

Q. Is there any particular time to which you can point as related to a loss of 14 per cent in power?

A. Any particular day?

Q. Yes.

A. No, sir.

Q. Have you made any computation of loss of energy to the plaintiffs by reason of the decrease in head?

A. Where there is less power, of course there is a loss of energy.

Q. But they are not the same thing?

A. No, sir, not actually the same thing.

Q. Really it is a loss of energy that counts rather than a loss of power?

A. Loss of either one would count.

Q. Would you ever have a loss of power without having a loss of energy if you are not operating?

A. Yes, but we are operating.

Q. What I am getting at is: you would not have the court understand that the loss in power that you claim to exist was the same thing as loss of energy to the plaintiffs?

A. Loss of power entailed by the decrease in the operating head on these wheels occurred to some degree and to some extent every minute when those flashboards were up. [fol. 132] Q. Of course power and energy are not the same thing?

A. Not exactly, no.

Q. Have you taken any data concerning the river conditions that applies to these plaintiffs when all of the flashboards on the Federal dam were in place and erect?

A. Actual surveys of the water condition?

Q. Yes.

A. I don't believe any of the days that I selected when the flashboards happened to be fully up.

Q. So the answer is you have not taken any such data?

A. Not when the flashboards were erect.

Q. When the simultaneous gauge readings in Plaintiffs' Exhibit 10 were taken what were the weather conditions?

A. You mean as regards whether rainy or fair?

Q. Particularly with reference to the wind, its direction and force.

A. There was very little wind in any direction on any of those four days.

Q. What enables you to state that?

A. I made a note of it when they were taken.

Q. That is customary when such records are made?

A. Yes, sir.

Q. You testified that the plaintiffs' plants were also equipped, also have certain auxiliary equipment besides the water power?

A. Yes, some of them.

Q. And that auxiliary equipment consists of what?

A. In the case of the Mohawk Paper Makers, steam power, and in the case of the Asbestos, electric power, and the Little Falls Fibre Company has no auxiliary power at this time.

Q. But the auxiliary equipment of the plaintiffs, of the two plaintiffs which are thus equipped, has been there for some time, at least long before flashboards were put on the dam?

A. Yes, I believe so.

Q. And such auxiliary equipment is necessary to the operation of those two plants even if there are not any [fol. 133] flashboards on the dam?

A. During certain times of the year, yes.

Q. Have you any records to show what the auxiliary equipment was that was used when flashboards were on the dam, as compared with the auxiliary equipment that was used before flashboards were there?

A. No, except that I do know that the day when the flashboards were put on the dam the Asbestos Spinning and Weaving Company had to start their motor on that very afternoon, and it had not been used before in a number of months. I do know that at that time also the paper company also had to start their auxiliary steam engine.

Q. But that has particular reference to the day in question?

A. In one case it occurred on the very day; in the other case I think they had some trouble with a wheel and the engine had been started.

Q. Your exhibit, Plaintiffs' Exhibit No. 9, it appears that the old State dam had an elevation at its crest of 13.2 feet?

A. Yes, sir.

Q. And with flashboards the elevation was 15.2?

A. Yes, sir.

Q. Have you anything to show whether these plants of the plaintiffs lost any power by reason of the addition of the two foot flashboards on the old State dam?

A. Naturally they lost power.

Mr. Whalen: I move to strike out the answer.

The Court: Stricken out.

Mr. Whalen: Have you anything to show in regard to that, any records?

A. I haven't any record, but it is a fact.

Mr. Whalen: I move to strike out that it is a fact.

The Court: That it is a fact may go out.

[fol. 134] Mr. Whalen: Your Exhibit 15, which I show you, does that have any significance in determining the back water at the plaintiffs' plants?

A. Yes, sir.

Q. In what respect?

A. In respect it shows that there was very little slope. In other words, that the elevation at Troy is practically the same as that of Waterford, except under freshet conditions, and, therefore, if any increase in the height of the water be made at Troy, the increase is felt at Waterford, or at the mills of the plaintiffs.

Q. At Troy in February, 1925, according to the Exhibit 15, there was an elevation of 17.80?

A. Yes, sir.

Q. In August it was practically the same, .03 less, is that right?

A. Yes.

Q. At Waterford in February it was 18.39?

A. Yes, sir.

Q. But in August the average was the same as the average of Troy?

A. Yes, sir.

Q. In asserting the loss which you claim that the plaintiffs have sustained by reason of the back water due to the presence of the flashboards on the Troy dam, do you base your assertion upon the per cent of backwater conditions after the flashboards have been put in position with the river conditions as they existed after the power plant had been put in operation, but before the flashboards were installed?

A. I couldn't possibly answer that question. If you could state it with a little more brevity, possibly I could answer it.

Q. Have you made a comparison of the river conditions existing after the installation of flashboards with the river conditions as they were after the defendant's power plant commenced to operate, but before the flashboards were put in place?

A. A comparison of what?

[fol. 135] Q. Conditions at the plaintiffs' plants?

A. As regards power?

Q. Tail water?

A. In connection with the use in this particular case?

Q. Yes.

A. Naturally I have not because flashboards were installed and I had no knowledge of it. I did not know they

were going to be installed. So in connection with this case I could not make any study of the tail or levels, or anything.

Q. You testified there has been a loss of power varying from 9 per cent to 14 per cent due to the installation of flashboards?

A. No, sir.

Q. Well, will you correct me?

A. Yes; that is what I estimate it. I testified that there was a percentage of loss of power in those wheels due to a raising of the tail-water, from 9 to 14 per cent. There are other losses besides that. Other power losses due to those flashboards.

Q. Then your figures of 9 to 14 per cent relate to what?

A. To a loss of head at the plants of the plaintiffs.

Q. Over what period of time?

A. Over any period of time.

Q. Whether before or after the installation?

A. Any loss of head within the ranges from one to two feet, would create a loss of power due to a loss of head from 9 to 14 per cent.

Q. Have you calculated the percentage of loss of power to the plaintiffs' plants, following the installation of the flashboards upon the Federal dam at Troy?

A. For any particular day or for any particular week or—.

Q. Subsequently to June 16th, last?

A. Except in this way. That on any day when the loss of head was one foot a loss of power, or a certain percentage of the power that was being used on that day.

[fol. 136] Q. Is that based upon observation or is that a theoretical calculation?

A. It is a calculation.

Q. At any time prior to the installation of flashboards on the dam, have you made an estimate of the power at the respective plants of these three plaintiffs?

A. Yes, I have.

Q. Is that included in any of the exhibits which have been put in evidence here?

A. No, sir.

Q. Are you able to point to any particular day commencing with June 16, 1925, and subsequently thereto, when

e has been a loss of power at the plant of either of the
ntiffs, the amount of which you can state?
No, I have never attempted to calculate the actual
of power on any particular day. Naturally there was
s of power on any day when the flashboards were there.
r. Whalen: I ask that the last part be stricken out.
ne Court: Strike out, beginning with the word naturally.

Redirect examination by Mr. O'Connor:

I understood that you said that in addition to the
of power resulting from the loss of head caused by
e flashboards there was some other loss of power re-
ng from their presence on the Troy dam, is that cor-
?
. Yes, sir.
State what that is?
. It is a loss of power due to the decrease in the effici-
at the wheels because of the submergence of the run-
or the wheels themselves, by water, due to the erection
he flashboards.
. You mean the water is raised above the runner of the
el itself?
. Yes, sir.
. And what does that cause?
. It causes a decrease in the efficiency of the wheel.
. 137] Q. And decreases the power available to the
pany?

he Court: That when the water is raised it clogs the
el and interferes with the efficiency of the wheel?

. Yes, sir.
. There is difficulty in the water escaping, is that what
really mean?
.. No, the fact that the wheel is drowned, that is the
ression, submerged partially or totally.

Ir. O'Connor: You mentioned in your answer to Mr.
alen's questions there was some difference between the
n energy and the term power. I don't know just what
it. Will you tell me?
.. Mr. Whalen had reference to power that might be
ilable and the energy I suppose that actually existed,
actual loss of energy.

Q. I don't quite get that clear. You mean energy—do you mean the power that is actually taken off of that of the the wheel?

A. No, I understood he meant the power that might be there if the plant were in operation.

Q. You stated in answer to his question that you did not make any survey on the days that these flashboards were up. Did you make any study of the river conditions on any day when these flashboards were up?

A. The flashboards were up every day when I did any work, except possibly October 26th. I took simultaneous readings then. There is no way of telling whether they were up or down.

Q. Referring to these days which have been plotted on the Plaintiff's Exhibits 7 and 12, will you tell me what was the condition of the flashboards on those particular days?

A. On those days the fiashboards were partially up and [fol. 138] partially tipped; some of them were tipped over.

Q. How about October 1st? Weren't they all up on that day?

A. No. They were not all up after September 14th. They were partially up on that day.

Q. Will you tell us how those days were selected which appear on Plaintiffs' Exhibit 11 and 12?

A. They were selected so that I might get the data to furnish the slope of the river under varying discharges. They were selected because there was a diversity of discharges on those days.

Q. Was there any time between June 16th, 1925, and October 26th, 1925, when these flashboards were entirely off the dam?

A. No, there was not.

Q. Sometimes they were all on and sometimes they were partly down?

A. Yes, sir.

Q. Referring again to these Plaintiffs' Exhibits 11 and 12, Mr. Whalen called your attention to the fact that in case of October 1st, 1925, the water elevation at Waterford appeared to be .07 of a foot lower than the water elevation at the Troy dam, and then on October 24th, 1925, the water elevation at Lock 2, Waterford, appears to be .05 of a foot lower that the water elevation at Troy. Can you explain to us why such a condition should appear?

A. Yes. Those gauges can only be read to the nearest half-tenth, that is, .05. If a man reading one gauge, read what he considered to be the correct reading, a man reading the other one might read .05 different, assuming that it was the nearest point that the water reached—a negligible amount.

Q. Counsel for the defendant also asked you whether or not the red lines appearing on Plaintiffs' Exhibit 16 should be exactly flat and you stated that they should not be [fol. 139] exactly flat. Tell us what difference there should be there?

A. The difference is so small I could not show it there. The thickness of that line is a tenth of a foot, and a difference here of only .07 it would be impossible to show it—when the thickness of the line may have been a tenth of a foot or more.

Q. Mr. Whalen also asked you how much water would be discharged through this so-called notch in the Troy dam. By that I understood him to mean the space bounded by the crest, the lower crest on the east side, and a line drawn two feet above that crest, and you stated that with a flow of 5,000 second feet over that dam, that would all be discharged through that space, is that correct?

A. Yes, sir.

Q. Suppose under other conditions when there was more than 5,000 second feet?

A. There would be a higher elevation of water back of the dam.

Q. Tell us what effect that would be?

A. It would cause an increased discharge through that area.

Q. Over that same space?

A. Yes, due to an increase in the head above the dam forcing the water through.

Q. Suppose the water flowing over that dam with no flashboards on, was at an elevation of 18 feet, would there be more than 5,000 second feet passing through that particular space occupied at one time by the two-foot flashboards?

A. Yes, sir.

Q. Explain to us just how that happens?

A. It happens because the water is at a higher elevation than that necessary to force 5,000 second feet through there and have a greater pressure coming on that water, forcing it through that notch, as you call it.

Q. So that little slot, two feet high, would carry water at a greater velocity?

A. Yes, sir.

Q. And, therefore, more water would come through that notch?

A. Yes, sir.

[fol. 140] Q. And is that true at any time when the water is at a greater elevation than 17.2 at the Troy dam?

A. Yes, sir.

Q. Now, Mr. Whalen also asked you about the Delta and Hinckley reservoirs. Where does the water go from those two reservoirs?

A. It is used as regulation for the Barge canal, also used by a private water company in the city of Utica, some of it.

Q. And does all the water from those reservoirs come down the Mohawk river?

A. No, it goes to Buffalo and it goes into the Hudson. It goes both ways.

Q. Mr. Whalen also asked you, if you had computed the average loss of power, and I understood you to say that you had not. Will you please explain what you meant in regard to the average loss of power?

A. I said, that I had computed the average loss of power due to an increase in the height of the tail water in amounts varying from one to two feet, and it amounts to a consequent reduction of the water on most of the wheels of the plaintiffs. I said that the percentage ranged from 9 to 14, its only loss due to a loss in the head.

Q. You did not as yet compute the actual loss of power on each particular day during 1925, when those flashboards or a part of them were on the dam?

A. No, I have not.

Q. That loss of 9 to 14 percent, would be a loss which would accrue in the future as well as the past?

A. Any time when the height of the water in the tail races of the plaintiffs was raised by the flashboards.

Q. You also said that the fact that the water was going over the Kings dam, that is the plaintiffs' dam, might cause

some loss of head to the plaintiffs. Will you tell us about how much loss, if any, there was caused and just how there would be any?

A. I said there might be some loss of head. I don't re- [fol. 141] member just the words I said, a slight loss, or a loss in some small degree, purely theoretical; which would be due, to a conflux of two streams of water coming from two different directions, one from the dam and the other from the tail races. It would be negligible. It would be smaller than could be measured.

The Court: Would that result in the drowning of the wheel too?

A. Under very high water conditions, yes.

Mr. O'Connor: Would it be as much as a half-inch or quarter of an inch loss of head by reason of this convergence of the flows?

A. I think it would be impossible to calculate it; but under ordinary conditions I don't think it would be a hundredth of a foot, which is about an eighth of an inch.

Q. Now, there was a question and answer on the cross-examination of Mr. Whalen as follows—which I do not understand yet: "Q. If defendant's plant was closed, and water is allowed to pass over the dam without any flashboards, would the conditions in the pool above the dam be the same as they were before the defendant's plant was built, but after the construction of the Federal dam? A. Yes." Can you explain that answer to that question?

A. The answer is yes, but it might clear it in your mind if it were answered this way: If you take the plant away and the flashboards away then the conditions were just exactly as if the plant were gone and the flashboards were gone.

Q. That is, from 1917 to 1923, there were not any flashboards there?

A. Yes, sir.

Mr. Whalen: And the comparison of conditions then existing during that period from 1915 to 1923, with the [fol. 142] conditions existing after the installation of the flashboards, affords a basis for calculating the loss of head to the plaintiffs' plants, doesn't it?

A. Any loss of head that might occur during that period, yes.

Q. Water from the Delta and Hinckley reservoirs is used to increase the flow of the Mohawk, is it not? It is used to no other purpose?

A. Yes, sir.

Q. And the amount of the flow of the Mohawk determines, too, any waste there is over the top of the plaintiffs' dam, doesn't it?

A. To some extent, yes. All the water in the Mohawk river does not go through that sprout, there are several other sprouts.

Q. But the condition of waste over the top of that dam is dependent on the volume of water that comes down the Mohawk to the Hudson, through sprout No. 4?

A. Yes, with the provision that some of the water back of that dam is taken through Kings canal.

Q. Weren't these water wheels at plaintiffs' plants encased in what you call drums?

A. No. Some of them were encased in what you call scroll cases.

Q. What are they?

A. Steel cases which are installed at the end of the penstock. The water is lead through that penstock into this case and turns the wheel. Some of them have open settings—most of them have open settings.

Q. And does that water cause the tail water to set back against the wheels?

A. It has nothing to do with the tail water.

Q. Is there any device surrounding the wheels in plaintiffs' plants to protect them from the effect of a rise in the tail water?

A. No, sir, there is not.

Q. In an open setting wheel, the scroll case is always set below the water, is it not?

A. In an open setting there is no scroll case.

[fol. 143] Q. They do not exist together?

A. No, sir.

Mr. O'Connor: These Hinckley and Delta reservoirs are used in connection with the State Barge canal system?

A. Yes, sir.

Q. And were built for that purpose?

A. Yes, sir.

Q. And the water is used for the purpose of supplying the Barge canal for navigation?

A. Yes, and regulating the flow of the Mohawk.

Q. Referring to Plaintiffs' Exhibit No. 2, will you tell me whether or not the water used in the Barge canal operations is by-passed around the plants of the plaintiffs?

A. Yes, sir.

Q. And will you show us on Plaintiffs' Exhibit 2, how it is by-passed?

A. Taken from a point back of the Crescent dam, it is taken through the Erie division of the Barge canal and discharged through Lock 2, and sent into the Hudson.

Q. It is discharged downstream below the plaintiffs' plant?

A. Yes, sir.

The Court: You show on this a number of branches of the Mohawk beginning with the third and ending with the seventh?

A. Yes, sir.

Q. Are there also two other branches, one and two, not shown?

A. No, sir, that is an error.

Mr. O'Connor: Those are branches that have been practically filled in?

The Court: The designations are arbitrary?

A. Yes, sir.

Q. Is this the method of by-passing?

A. Yes. In this case it was done by means of this dam and gates here. The water that is let through these gates naturally is by-passed around this section.

[fol. 144] Mr. O'Connor: The plaintiff rests.

Mr. Whalen: I move, if your honor please, for a dismissal of the complaint on the ground that the plaintiffs have not proved facts sufficient to constitute a cause of action in favor of either one of them.

The Court: Motion entertained and denied.

Mr. Whalen: Exception.

ROGER WISEMAN, called as a witness by the defendant, sworn, direct examination by Mr. Nichols as follows:

Q. Where do you live?
A. Troy, N. Y.
Q. What is your business?
A. Captain of a tug boat.
Q. By whom are you employed?
A. Cornell Steamboat Company.
Q. Does the Cornell Steamboat Company operate tug boats on the Hudson river?
A. Yes, sir.
Q. Both above and below the Federal dam at Troy?
A. Yes, sir.
Q. How long have you been employed by the Cornell Steamboat Company?
A. Fourteen years.
Q. During that period, have you operated tugboats over the section of the Hudson river south of Waterford and north of Albany?
A. Yes, sir.
Q. Where is your principal run?
A. Between Waterford and Troy.
Q. Did you go over that run about every day?
A. Yes, sometimes two and three times a day.
Q. And you have for the last 15 years?
A. Yes, sir.
Q. And operating tugboats over that section of the river, you carry freight?
A. Yes, sir.
Q. And did you know where that freight was bound for?
A. Buffalo to New York, mostly.
[fol. 145] Q. Do you know the final destination of that freight, some of it was beyond New York?
A. Yes, sir.
Q. And in other States?
A. Yes, it is reshipped a good deal.
Q. Is it also reshipped to points in Canada?
A. Yes, the freight coming north. It comes up the river that goes to Canada.
Q. You carry freight in both directions?
A. Yes, sir.

Q. And do you know whether it is shipped into Canada?

A. Yes, sir.

Q. I show you Plaintiff's Exhibit 2. Do you recognize that as a map of the section of the Hudson river from Troy north of Waterford?

A. Yes, sir. There is the Federal dam and here is Waterford.

Q. Do you see the point on that map marked Federal dam?

A. Yes, sir.

Q. And on which side of the Federal dam is the lock?

A. On the east side.

Q. And what is the direction of the channel north of the Federal dam?

A. Towards the west.

Q. That is, it starts on the east side of the Hudson river at the lock and then crosses in a diagonal direction across the river to the west side of the river?

A. Yes, sir.

Q. And what is the direction of the current above the Federal dam?

A. Why, it is pretty nearly south.

Q. So that the current crosses the main channel north of the dam on an angle?

A. Yes, sir.

Q. What effect does that have upon tows passing through that channel in a southerly direction?

Mr. O'Connor: Objected to as incompetent, and irrelevant and immaterial. There is no evidence in this case that there is any authority on the part of the defendant to improve the navigation of the river or to assist tugboat cap- [fol. 146] tains in navigation on the river. There is no navigator or any person desiring to use the river for navigation, a party to this action and it is immaterial and irrelevant in this case. I object to it on the ground that an individual has no authority to improve a river unless he establishes some definite authority from the Federal Government. I have no right to blow out a bridge that interferes with navigation unless I have some authority back of me. They have offered no proof that the Government did authorize them to do that.

The Court: I expect that is coming. Objection overruled.
Mr. O'Connor: Exception.

The Witness: It draws them towards the dam, out towards the end of the pier at the lock.
Mr. Nichols: Does that interfere with boats going into the lock?
A. Yes, it draws them towards the dam. Any water running over the dam it draws them there; and if you have to cross the river just above the dam it has a tendency to pull them out on to the north wall of the lock.

Q. These boats that you run up and down the river consist of several barges connected together at times?
A. Yes, sir.
Q. And each connected with a tow rope?
A. Yes, sir.
Q. What effect does the current without any flashboards on the dam have upon long tows in going down into the lock from above?
A. It carries them out towards the dam.
Q. Does that tend to interfere with an easy approach to the lock from above?
A. Yes, sir.

[fol. 147] Mr. O'Connor: May I have this all subject to my objection?

The Court: Yes.

Mr. Nichols: Do you recall a time last summer in 1925, when flashboards were placed upon the main or east crest of the Federal dam?
A. Yes, sir.
Q. Did you navigate the channel after those boards were placed on there?
A. Yes, sir.
Q. Did you notice any difference in the effect of the current on the tows entering the lock from above going south?
A. Yes, it improved the conditions around the lock.

Mr. O'Connor: I move to strike that out.
The Court: Stricken out.
Mr. Nichols: Did you notice any difference from what the conditions were before the flashboards were put on?
A. Yes, sir.

Q. What was that difference?

A. It did away with the cross tide and made it what we call a straight tide in there, entering the lock.

Q. Was it easier or more difficult to get into the lock from above after flashboards were put on than it was before?

A. Easier.

Q. What do you say as to the amount which can be carried in barges before and after flashboards were on that dam?

A. Flashboards caused more water above the dam.

Q. You mean it deepened the channel?

A. Yes.

Q. And as a result of that you could carry heavier loads?

A. Yes, sir.

[fol. 148] Q. What do you say as to the width of the channel as compared before and after flashboards were put on?

A. It raised the channel and made the channel wider.

Q. Did that make any difference in the passing of the boats?

A. Yes, between the bridge and the lock the channel is very narrow and when the water is down low we cannot pass anybody in there, if the water is below the high part of the dam, the part of the dam nearest the west shore.

Q. Does the placing of flashboards on the dam make it easier for tows and boats to pass in that channel?

A. Yes, sir.

Q. Are there any docks along the east bank of the pool above the dam?

A. Yes. Shaughnessy's dock. We use it for a terminal for the boats going north.

Q. Are boats tied up to those docks at various times?

A. Yes, sir.

Q. And have you ever before flashboards were put on the dam seen boats aground in that section?

A. Yes, sir.

Q. Have you ever seen boats aground in that section after flashboards were put on?

A. No, sir.

Q. Have you ever seen boats tied at those docks when flashboards were on the dam?

A. Yes, sir.

Q. As I understand it, the lock is formed by the erection of a wall in the river out some distance west of the east bank of the river, is that correct?

A. Yes, sir.

Q. Will you state the condition of the north end of that river wall?

A. It has been hit a good many times. It is pretty well—pieces taken out of it.

Q. Hit by what?

A. Barges, tows.

Q. What is the cause of barges striking that north end of the river wall of the lock?

A. The tide cutting across the channel.

[fol. 149] Q. You mean pulling the tows around against the north end of the wall?

A. Yes, sir. The current drawing the tows.

Q. And that was a condition which was caused when flashboards were not on the dam?

A. Yes, sir.

Q. Have you ever been aground north of the Federal dam?

A. Yes, sir.

Q. How many times?

A. Several times.

Q. Can you make it any more definite that that?

A. I would say a dozen different times.

Q. Have you ever been aground at any time when flashboards were on the dam?

A. No, sir.

Q. What do you say as to the condition of the current south of the dam when flashboards are not on the dam?

A. It runs across there in a narrow raceway, as we call it.

Q. In which direction?

A. Below the lock across where the channel is, where it runs down over the narrowest part of the dam, and there it runs down like a raceway and it strikes in the channel.

Q. You mean when there were no flashboards on the dam?

A. It just runs over what we call the low part of the dam.

Q. And those currents tend towards the east bank of the river below the dam?

A. Yes, sir.

Q. And what was the effect of that on tows entering the lock from below?

A. It makes eddies and whirlpools.

Q. Does it interfere with tows getting into the lock from below?

A. Yes; it is hard to navigate without hitting the wall.

Q. Was that condition changed when flashboards were on the dam?

A. Yes, sir. It equalizes the current and it is sort of a pool down there then; no current at all.

[fol. 150] Q. Now, it is much easier to get in the lock from below when there are flashboards on the dam than when there are not?

A. Yes, sir.

Q. In your opinion, as a navigator of this channel, do you think the flashboards are of help or a hindrance to navigation?

Mr. O'Connor: Objected to as incompetent, irrelevant and immaterial.

The Court: Objection overruled.

Mr. O'Connor: Exception.

The Witness: A big help to navigation.

Mr. Nichols: I show you a photograph marked Defendant's 6 for Identification and ask you what that is?

A. That is the Federal lock at Troy.

Q. Is that a true and correct representation of the lock as it exists to-day?

A. Yes, sir.

Mr. Nichols: I offer it in evidence.

Received and marked Defendant's Exhibit No. 6.

Q. Is that a view of the river looking north from the east bank of the river?

A. Yes, sir.

Q. What do you say as to the elevation of the pool above the dam after flashboards were put on from what it was at the time before the Ford plant was operated?

A. It is about the same. Before Ford started to draw that water down, the water very seldom was ever below the high part of the dam, except for a very short period; but we never had the low water after they put the flashboards on.

Q. Flashboards tended to correct that?
A. Yes, sir.

[fol. 151] Cross-examination by Mr. O'Connor:

Q. What do you suppose causes this current that carries it towards the dam?
A. The water running over that low part of the dam.
Q. Doesn't the water run over the flashboards?
A. Yes, but it is equalized.
Q. Doesn't it run over the flashboards?
A. Very seldom, unless the water is high.
Q. Do you want to testify here that that water is very seldom over the flashboards?
A. They only have it on there when there is really dry weather in the summer, and the biggest part of the time it is only half way up on the flashboards.
Q. You are sure about that?
A. Last year they had a freshet——
Q. You are sure about the fact that most of the time last summer the water was below the crest of those flashboards?
A. After they put it on—the first time the flashboards were put on.
Q. After the freshet was over, did the water go back below the crest of the flashboards?
A. They tip over. At first fall they were tipped over quite some time.
Q. They were on there about a month first?
A. Yes, sir.
Q. And during all that time was the water below the crest of those flashboards?
A. No, sir.
Q. How much of the time?
A. I would say half.
Q. And that is the best testimony that you can give here today?
A. Yes, sir.
Q. And if the records taken by the Federal employees at the lock show the direct contrary to that testimony then you must be mistaken about some of your testimony here today?
A. I have seen it only about half-way up on the flashboards until it rained.

[fol. 152] Q. For the first month, you want to say, half the time the water was below the crest?

A. I won't say for half the time.

Q. You won't say as much as a quarter?

A. Yes. I would say that.

Q. Isn't it a fact that there were only one or two days that the water was below the crest of those flashboards?

A. I remember seeing it quite a lot.

Q. The other three-quarters there was water running over the flashboards?

A. Yes, sir.

Q. And water running over the whole dam?

A. Yes, sir.

Q. Now, that created a current, didn't it?

A. Yes, but it was equalized over the whole dam.

Q. Do you run over on the west shore when you go to the lock?

A. No, we go over on the Ford's.

Q. That is when you are going into the lock?

A. We have to go down that channel and we go across.

Q. Have you gone across 2,000 feet upstream?

A. We tried to but there is an island we have to clear.

Q. But you are 1,500 feet at least from the dam when you go across?

A. Yes.

Q. When there is water going over the dam there is a current, isn't there, in that river, that you feel?

A. Yes, sir.

Q. And that current draws you whether there are flashboards on the dam or not, as long as the water is going over that dam?

A. Not so much. When the flashboards are there the water runs over the other part of the dam. You don't feel it until you get almost to the lock. There is holes in those boards. When we get almost to the lock is where you feel it.

Q. You have got the same situation up at the Crescent dam, too, haven't you?

A. I was never up there.

[fol. 153] Q. You know that they do have the same trouble at either dam, in the Mohawk or Hudson, getting into a lock that comes into a dam?

A. If there is much water they have to quit. They can't run when the water is very high up there.

Q. So that condition existed at every lock going through a dam in the river?

A. All the other locks except the Crescent lock all open from the bottom. They let the water out on the opposite side. They have gates they raise up.

Q. They have the same trouble up at the Dam No. 3, at Mechanicville, two at Mechanicville, Dam No. 3 and at Sylvan Beach they had an awful lot of trouble with the same thing?

A. I am not familiar up that way.

Q. Now, when did you first notice this deeper water in the river?

A. What do you mean?

Q. You said that last summer you found the water got deeper so you didn't have trouble with your boats?

A. That is when the flashboards were put back and raised the level above the dam.

Q. You really think it raised the water in that river when they put those on?

A. Yes, above the dam.

Q. It raised the water, above?

A. Sure.

Q. Positive about that?

A. Yes, sir.

Q. You went through there after the flashboards were put on every day?

A. Yes, sir.

Q. And you found that the water had been raised and it was deeper?

A. Yes, sir.

Q. And how much do you think it was raised?

A. Anywhere from a foot to two feet.

Q. And you found that condition to exist all the time the flashboards were on?

A. Sometimes it would be below the crest of the flashboards.

Q. Would that pull it down?

A. Yes.

[fol. 154] Q. But you found that the flashboards did raise the water from one to two feet on your end of the river there after they were put on?

A. Yes, sir.

Q. What is the maximum draft of boats going through the Barge canal?

A. Ten feet, ten and a half feet.

Q. That is the most, that is the greatest draft that can go through the canal?

A. Yes, but we have some 11 feet—Murray boats.

Q. Do they go through?

A. They do.

Q. But ten feet and ten and a half is about the limit?

A. Yes, that is about the limit.

Q. Can you give me one or two instances of boats going aground there?

A. Yes. I have seen the Hedgar tows.

Q. When was that?

A. A couple of years ago.

Q. Ever remember any before that?

A. Yes. Last two or three years before the flashboards were put on.

Q. Any longer back other than that?

A. No, sir.

Q. That would be back in 1922, then?

A. 1923 or 1924.

Q. Any before that?

A. I don't remember.

Q. How long have you been on that stretch of the river there?

A. I was there before the lock was built; before the Government dam was built.

Q. Before 1915?

A. Yes, sir.

Q. What is the width of the channel?

A. Whereabouts?

Q. Above the Troy dam?

A. It varies. Right above the dam is 400 feet. When we get up by Third street, Lansingburg, there is a shallow channel on the east side, but along by Shaughnessy's about 100 feet wide. On the other side, there is about—it is supposed to be a hundred and some odd feet, 150, but it isn't [fol. 155] that. The bells this year are about 100 feet apart.

Mr. Nichols: There are boats that travel this section of river that do not go through the canal?

A. Yes, sir.

Q. That is, the boats that you operate yourself do not go through the canal?

A. No, sir.

Mr. O'Connor: What do they draw?

A. About seven and a half feet.

Mr. Nichols: Do you remember the old State dam?

A. Yes, sir.

Q. Did you see flashboards on that?

A. Yes, sir.

Q. Did they put them on every year?

A. Every year.

Mr. O'Connor: When?

A. The time I can remember before they built the new dam they took them off in the fall and put them on in the spring.

Mr. Whalen: I offer in evidence the Act of Congress approved June 25th, 1910, being 36 Statutes at Large, chapter 382, with particular reference to the appropriation set forth at pages 635, 636.

Received and marked Defendant's Exhibit No. 7.

Mr. Whalen: Also I offer in evidence the Act of Congress, approved March 4th, 1913, being 37 Statutes at Large, chapter 144, with particular reference to the appropriation on page 804.

Received and marked Defendant's Exhibit No. 8.

Mr. Whalen: I offer in evidence certified copy of the application made by the defendant to the Federal Power Commission with attached maps, two maps, the first of [fol. 156] which is identical with Plaintiffs' Exhibit No. 2.

Mr. O'Connor: No objection.

Received and marked Defendant's Exhibit No. 9.

Mr. Whalen: I also offer in evidence certified copy of Water Power License, Project No. 13, issued by the Federal Power Commission to defendant March 3rd, 1921, with attached certified copy of the defendant's acceptance thereof, dated March 29th.

Mr. O'Connor: No objection.

Received and marked Defendant's Exhibit No. 10.

Mr. Whalen: I offer in evidence, photostatic copy of the regulations approved by the Secretary of War December 2nd, 1924, with blue prints thereto attached. And I will ask the plaintiff to concede that those were the regulations which accompanied the original of Plaintiffs' Exhibit 18?

Received and marked Defendant's Exhibit No. 11.

HARRY R. PERKINS, called as a witness by the defendant, sworn, direct examination by Mr. Nichols as follows:

Q. Where do you live?
A. At Troy, N. Y.
Q. Who do you work for?
A. Henry Ford & Son.
Q. In what capacity?
A. As chief engineer.
Q. Do you have charge of the power station at the Green Island plant of the defendant?
A. I do.
Q. Are you a hydraulic engineer?
A. No.
Q. Civil engineer?
A. No.
Q. You have been engaged in that business for how long? How long have you been employed by Henry Ford and Son?
A. About three years.
[fol. 157] Q. Have you had charge of the defendant's power plant at Green Island, since it was constructed?
A. Yes, sir.
Q. Did you in June, 1925, install the flashboards upon the main crest of the Federal dam?
A. Yes, sir.
Q. Will you describe those flashboards?
A. The flashboards were made up two by twelve out of yellow pine lumber nailed to wood uprights which in turn were fastened to pins, iron pins, with U-bolts, the pins set in inserts in the top of the dam.
Q. How long were the pins?

A. About three feet long.

Q. How far down into the crest of the dam do they extend?

A. About a foot.

Q. And are they placed in holes on the main crest of the dam?

A. They are.

Q. Did you place those holes there?

A. No. Those holes were already in place.

Q. I show you Defendant's Exhibit No. 11 and ask or direct your attention to the second blue print attached thereto and ask you if that shows the specifications of the flashboards which you erected on the main crest of the dam in June last year?

A. It does.

Q. Did the flashboards which you erected conform to those specifications?

A. Yes, sir.

Q. What day did you put the flashboards on the dam?

A. The original erection of flashboards was completed on June 16th, 1925.

Q. How long did they remain in place?

A. The first failure was July 23rd, 1925.

Q. And did all of the flashboards fail at that time?

A. No.

Q. What percentage failed, as near as you can tell?

A. Roughly, a third to a quarter.

[fol. 158] Q. Do you know upon what elevation they failed?

A. I noted 18.9 feet. That would be from Sandy Hook data.

Q. That is the mean sea level?

A. Yes, sir.

Q. And in order to get the Barge canal you add .87 of a foot to that?

A. Yes, sir.

Q. That would make 19.77?

A. Yes, sir.

Q. Were the flashboards repaired subsequent to the date of failure?

A. Yes, sir.

Q. And on what date?

A. They were repaired again September 1st.

Q. And did they fail again after that?

A. The second failure occurred September 14th.

Q. And what percentage failed that time, do you know?

A. About the same percentage.

Q. Did you repair the collapsed sections of them after the second failure?

A. No.

Q. Subsequently did all of the boards fail?

A. Yes, sir.

Q. Are there any boards on the dam now?

A. I can't say whether there are any there now or not.

Q. So far as you know there are not any on there?

A. The water has not been off of the dam since the last failure.

Q. That is, it is impossible to tell without inspection of the crest of the dam?

A. No.

Q. And that cannot be done when the water was flowing over the dam?

A. It could be, yes; if it is not too deep.

Q. Is there a dock located on the west side of the pool north of the dam?

A. Yes, sir.

Q. And who uses that dock?

A. The Ford Motor Company.

Q. Is the Ford Motor Company connected in any way with the defendant?

A. What the connection is I don't know.

[fol. 159] Q. And that dock is used to tie up barges and tows?

A. Yes, sir.

Cross-examination by Mr. O'Connor:

Q. The power which you develop is used by that Ford Motor Company plant?

A. Yes, sir.

Q. And as a result of attaching those flashboards did you improve the head on your hydraulic equipment?

A. Yes, sir.

Q. And substantially?

A. Yes, sir.

Q. And as a result you had more power to deliver to the Ford Motor Company?

A. Yes, sir.

Q. And did you use those flashboards in the operation primarily to increase the head or for pondage purposes or both?

Mr. Whalen: Objected to as calling for a reason.

The Witness: Both, I would say.

Mr. O'Connor: Has that improved your head and also given you some storage?

A. Yes, sir.

Q. In the operation of that plant your head varies each day as a result of the tidal influence below your plant?

A. Yes, sir.

Q. What is that variation?

A. I would say it would average about four feet.

Q. That is, from its highest to the lowest point?

A. Yes, sir.

Q. A four-foot variation?

A. Yes, sir.

Q. And, of course, that means that the head on your hydraulic equipment is variable to that extent, four feet?

A. Yes, sir.

Q. During 24 hours?

A. Yes, sir.

Q. Now, on July 23rd, I understood you to say only about a third or a quarter of these flashboards failed or tipped over.

A. Yes, sir.

[fol. 160] Q. And the remainder continued upright?

A. An inspection of the flashboards showed that only a very small part, as I remember, stood perfectly upright; they were tipped more or less. This third or a quarter, were lying down flat.

Q. At what point do those regulations require flashboards to fail?

A. Pins are designed to fail according to the blue print, with about two feet of water passing over the top of the flashboards—at 18.5 mean sea level.

Q. That would be 19.2 Barge canal?

A. No, 19.37.

EDWARD BURR, called as a witness by the defendant, sworn, direct examination by Mr. Nichols as follows:

Q. Where do you reside?
A. New York city.
Q. What is your business?
A. Consulting engineer.
Q. Are you a graduate of West Point?
A. Yes, sir.
Q. What class?
A. 1882.
Q. And upon your graduation from West Point were you commissioned in the United States army?
A. I was commissioned in the Corps of Engineers of the United States Army.
Q. How long a time have you spent in the Corps of Engineers of the United States Army?
A. From July 1st, 1882, to May 23rd, 1923, when I was retired for age under a statute so providing.
Q. Under what rank were you retired?
A. Colonel.
Q. Was your rank raised upon your retirement?
A. It was not.
Q. Did you serve in France during the war?
A. I did.
Q. In the Corps of Engineers?
A. No, I was a brigadier general for the line, the corps engineers doing partly staff duty and partly line duty. To make us correct, I served with the field artillery.
[fol. 161] Q. During your service of approximately forty years in the corps of the United States Army were you stationed at various points in connection with river and harbor development?
A. I was.
Q. At what points?
A. Portland, Oregon; Norfolk, Virginia; St. Louis, Missouri; Boston, Massachusetts; San Francisco, California; and New York city.
Q. In what capacity were you engaged at New York?
A. On returning from France in February, 1919, I was assigned to duty in charge of the First Engineer district of New York city, which district has charge, among other things, of all federal improvements in the New York har-

bor and also in the Hudson river from New York city to Waterford, which section included also the Troy lock and dam.

Q. While you were Colonel in charge of the New York district office, was there submitted to you an application by Henry Ford & Son, Inc., for the development of power at the Troy dam?

A. There was by Stone and Webster, their representative.

Q. Acting as representative of the defendant?

A. Yes, sir.

Q. And what did you do when that application was submitted to you?

A. The application first came to me in the way stated——

Mr. O'Connor: I think it is immaterial. The application was filed and a license issued and no contest about that here. It is in writing and any proceedings leading up to it are immaterial.

The Court: Objection overruled.

Mr. O'Connor: Exception.

The Witness: Informally from Stone and Webster with a view to getting the opinion of the district engineer informally, and for the purpose of making changes informally [fol. 162] which he might think desirable in the interest of the federal improvement. The application and all the papers attached thereto were carefully examined. Certain conclusions were reached as to what changes were desirable to be in the interest of navigation. The papers were returned to Stone and Webster with comments covering the changes which the district officer felt should be made. Subsequently, within a few weeks, Stone and Webster submitted the same application formally for the action of the War Department—the same applications with the corrections and changes made which had been suggested by the district engineer as to the informal examination of the papers. Those papers were submitted formally to the district engineer and after further examination of them he submitted to his next supervising officer, those recommendations, for action, based upon statements of his which he embodied in his report.

Q. At the time that you made your recommendations to the chief engineer he, I understand, was your immediate superior?

A. He was.

Q. And he was under the Secretary of War?

A. Directly under the Secretary of War.

Q. At the time that you made those recommendations did you have in mind the contemplated use of flashboards on the main crest of the federal dam?

Mr. O'Connor: I object to that.

The Court: Objection sustained.

Mr. Nichols: You did make recommendations to the War Department?

A. Yes, sir.

Q. What was the elevation of the main crest of the federal dam?

A. Using Barge canal datum, 15.2.

[fol. 163] Q. And do you know how that compares with the elevation of the old State dam which the federal dam replaced?

A. The same level as the old State dam with two-foot flashboards up.

Q. So that the pool height of the present dam is the same as that formed by the old State dam with two foot flashboards?

A. The pool height with the water in the pool, with the water at the crest of the Federal dam, would be 15.2 which was the same as the pool height in the days of the old State dam, with the flashboards on.

Q. Now, when the Federal dam was built was the use of flashboards contemplated?

Mr. O'Connor: I object to that as incompetent, irrelevant and immaterial.

The Court: Objection sustained.

Mr. Nichols: Will you state what the general direction of the channel above the dam is?

A. The projected government channel covers the stretch from the Federal lock at Troy to Waterford, a point about opposite the entrance of the Erie division of the Barge canal. Leaving the Federal lock, proceeding upstream, it

crosses diagonally to the west bank of the Hudson river to a point shortly above the third branch of the Mohawk.

Q. That is, it extends from the east side at the dam to the west side near Waterford?

A. No, part of the way to Waterford, to a point above, I think that is the third branch of the Mohawk, thence it makes a slight angle towards the eastward and follows in a general way a location which is approximately the center of the river to Waterford, the location being adapted generally to the line of deepest natural water.

Q. Is that channel above the dam maintained by the federal government?

A. Yes, sir.

[fol. 164] Q. What is the approximate width of the channel above the dam?

A. The designed channel was intended to be two hundred feet wide on the bottom and was excavated to that width for a depth of twelve feet below standard pool level at low water which is 15.2.

The Court: When you say above, you mean north of it?

The Witness: Yes, upstream.

Mr. Nichols: Will you describe the current above the dam as to direction with respect to the channel?

Mr. O'Connor: I make the same objection as to the testimony of Mr. Wiseman.

The Court: Objection overruled.

A. At a point, say about a thousand feet above the lock, which is on the east side of the river at the dam, the current just off the bank runs approximately parallel thereto; thence as the current approaches the lock it angles slowly to the westward so that in what is known among navigation engineers as the upper approach of the channel it crosses at a slight angle and diagonally across this channel proceeding front at about the same angle to the overfall over the main spillway of the dam. I am speaking of the current conditions with no flashboards up.

Q. Describe the current conditions below the dam without flashboards?

A. The overfall from the dam when the water is passing over the main spillway, the notch in the dam, first follows in a general way the direction of the river wall of the lock,

and then flows diagonally down stream to the eastward into the lower approach channel to the lock. I am again speaking of conditions that existed before the construction of the Ford Power Plant.

[fol. 165] Q. What are the principles most important to be considered in navigation?

A. The two most important feautres generally are the force and direction of the current.

Q. And how about the depth and width of the channel?

A. The depth—I should have added also the depth and width of the channel. They perhaps are the most important; but the force and direction of the current in some localities are of more importance than in others.

Q. Now, you described it before the flashboards. Describe what effect the operation of the power plant had upon the current both above and below the dam?

A. The operation of the power plant draws through the plant and to that side of the river, a volume of water which at times is a relatively large percentage of the total flow. To the extent to which the power plant thus draws water to the west side and away from the east side, it tends to reduce the strength of the pool and the current above the dam, and these currents which I have described as running across the upper entrance channel to the lock. Below the dam, at the time the Ford application was acted upon and approved, the location and direction and depth of the tail race was so required that the tail water from the plant is discharged, or is intended to be discharged down stream, far enough below the dam so that all, or the greater part of it will enter the channel west, and as little as possible will therefore find its way into the lower entrance channel of the lock. To the extent to which that aim was accomplished, the cross channels below the lock have been reduced.

Q. At what stages of water is that particularly true?

A. At low water when the greater part of the flow of the river is taken through the power plant and a relatively small part goes over the dam.

[fol. 166] Q. What is the effect of placing flashboards on the main crest of the dam upon the current?

A. The installation of flashboards on the dam to the extent to which they raise the level in the pool above the dam will reduce the strength of the current in that pool: Given

a certain amount of water flowing in the river, at any particular stage, any increase in the level of the pool which may result from the use of flashboards, would increase the depth, increase the area of the cross section and reduce the velocity of the current.

Q. If you have a certain amount of water flowing in a channel and you increase the cross section, what is the effect upon the same amount of water?

A. It will decrease the velocity of the water.

Q. The same amount will go through with a smaller velocity.

A. Yes, sir.

The Court: You mean widening it?

A. There would be some increase in the width, but the main effect would be the increase in the depth.

Mr. Nichols: If you have a 12-foot channel and you place two-foot flashboards on the dam and the water is raised to the top of the flashboards, you have increased the cross section of the channel from 12 to 14 feet?

A. Yes, sir. Assuming that the average depth of the cross section at a point say a thousand feet above the dam, is eight feet, which is approximately correct, if the depth is increased two feet by the use of flashboards, the average depth would be increased from eight to ten feet and the area of your cross section would be increased roughly 75 per cent, not taking into account the effect of the greater width as the level of the river is raised.

Q. With respect to the percentage of head when no water goes over the dam, what is the effect of flashboards?

A. Beneficial to navigation, particularly below the dam in [fol. 167] discharging the water; all of the water going through the plant and a small percentage finding its way into the low approach channel of the lock to create cross currents at that point.

Q. Describe the effect of the operation of the current on currents both above and below the dam. What effect does the installation of flashboards have upon the percentage of head in which there are low water stages?

A. I do not quite get it.

Q. What is the—does the installation of flashboards increase the low water stage, percentage of head? What do

you say is the effect of flashboards on navigation above the dam?

A. To the extent to which flashboards raise the level of the pool above the dam, they are beneficial to navigation, increasing the depth not only in the channel but the pool as a whole; and particularly in the shoal waters on each side of the main channel thereby carrying a greater depth of water up to the banks into any wharf that may be in existence along those frontages.

Q. You mean it brings more water closer in shore for the use of riparian owners?

A. If the flashboards do increase the depth of the pool about two feet, and a riparian owner has about eight feet along the front of his wharf, it would give him ten feet; eight feet without, and ten feet with the use of flashboards.

Q. And would also bring deeper water inshore?

A. Yes, sir. The draft of boats runs from seven or eight feet to about a maximum of ten or ten and one-half, and a ten and one-half foot boat would have a much wider channel through which to pass without the danger of going aground.

Q. What is the effect of the use of flashboards on shoaling?

A. All dredged channels through the bottom of natural streams have a tendency to refill under freshet water conditions and to the extent to which they refill the depth in [fol. 168] such channels is reduced below that for which it was designed. If flashboards increase the depth by two feet, they produce a depth equal to or perhaps greater than that designed in the dredged channel, and reduce the periods of time between the dates in which dredging must be undertaken to remove shoals which have formed in those waters. So they have two effects. They tend to give more depth over such shoals, and extend the period at which dredging must be done to reproduce full depth.

Q. Would you say it was easier or more difficult for tows to go upstream with flashboards on or off the dam?

A. If flashboards raise the level it would be easier for the two reasons already stated.

Q. Has the channel been dredged by federal action?

A. Part of the way; from federal lock to Waterford, dredging being done at such points when it was necessary to increase the depth to the designed 12-foot depth.

Q. Would you say that the maintenance of the flashboards on the dam made it easier or more difficult for tows to enter the lock from upstream going south?

A. Easier, without question.

Q. What is the effect of flashboards on the conditions below the dam?

A. By reducing the amount of water passing over the main spillway they decrease the cross currents flowing into the lower channel to the lock.

Q. Is that of benefit to tows entering the lock?

A. It is of benefit to tows proceeding in both directions, upstream and downstream.

Q. In your opinion is the maintenance of flashboards on the Federal dam at Troy a benefit to navigation?

Mr. O'Connor: Objected to as incompetent, irrelevant and immaterial.

The Court: Objection overruled.

[fol. 169] Mr. O'Connor: Exception.

The Witness: Yes, without doubt.

Mr. Nichols: I show you Defendant's Exhibit No. 10 on page 2, and ask you to read next to the last paragraph?

A. Yes, sir, I have read it.

Q. Was the statement contained in that paragraph based upon any recommendation that you made to the chief engineer?

Mr. O'Connor: I think that that is certainly objectionable. Here is a written paper in evidence, issued by the department of the United States.

The Court: Objection overruled.

Mr. O'Connor: Exception.

The Witness: Yes, sir.

Mr. O'Connor: I move to strike that answer out as incompetent, irrelevant and immaterial and not properly in evidence. This individual should not be allowed to come here and say what the government did or meant.

The Court: Motion denied.

Mr. O'Connor: Exception.

Recess to 8:30 to-morrow morning.

June 11th, 1926, 8:30 a. m.

Cross examination by Mr. O'Connor:

Q. Where were you in 1915 and 1916?

A. The Philippines.

Q. When did you come back?

A. I reached San Francisco in January, 1917.

[fol. 170] Q. When was the first time you came into the New York district?

A. In charge of the district in March, 1919.

Q. How long did you remain in that district?

A. In charge of the district until March, 1923.

Q. And when was the first contact you had with this situation at Troy?

A. With regard to the matter of the construction of the Federal dam, the lock at Troy, at that time, after I took charge of the district in 1923; I had had incidental contact with it earlier.

Q. Before you went to the Philippines?

A. Yes. in a minor matter.

Q. You know then of the old State dam which existed there. Was it a timber crib dam?

A. Yes, sir.

Q. And the crest of that dam had an elevation of 13.2 Barge canal datum?

A. Yes, sir.

Q. And during the summer months they maintained two-foot flashboards on the crest of that old dam?

A. Yes.

Q. Subsequently the federal government built this concrete dam in 1914 and 1915?

A. It was completed in 1915.

Q. And that dam was built to an elevation of 15.2 on one side, Barge canal datum?

A. The main spillway, as it was called, the easterly section of the dam, was built at that time to that elevation.

Q. And the other section was built to an elevation of 17.2?

A. Yes, two feet higher.

Q. So the westerly section was four feet higher——?

A. Than the crest of the old State dam.

Q. And the flashboards were not on in the winter on the old State dam?

A. No; they could not maintain them on account of the ice.

Q. The easterly section of the new Federal dam was two feet higher than the old State dam?

A. Yes, without the flashboards.

[fol. 171] Q. So you have an average rise across the river of three feet?

A. I don't get the three feet.

Q. Two feet for half and four feet for the other half?

A. It would not work in that way.

Q. You would rather leave it two foot rise on one side and four feet rise on the other?

A. I would leave it, the main spillway was two feet higher and the auxiliary as it was called, was four feet higher.

Q. How long was the old State dam?

A. It was 1,100 feet, I believe.

Q. And how long was this spillway which has an elevation of 15.2?

A. It is just short of 600 feet.

Q. Now, when this new Federal dam was constructed, it was constructed in connection with the Barge canal plans of the State of New York?

A. No, in coordination with them.

Q. And the pool level I understood you to say was designed for 15.2 Barge canal datum?

A. Yes, to provide a depth in the pool above the dam to accord with the elevation that the State had given to the miter sills and other controlling elements—depth in their first locks, upstream, from the Federal dam.

Q. The miter sills on Lock 1, Champlain, and the miter sills on Lock 2, Erie?

A. Yes.

Q. So that the Federal government took into consideration the fact that the Barge canal had or were constructing these locks, and it constructed a 12-foot draft under an elevation of 15.2?

A. Yes.

Q. And the federal work was done with that in mind?

A. To co-ordinate with the State plans upon that point.

Q. And for the purpose of navigation the entire Federal dam could have been constructed at 15.2 Barge canal datum, could it not?

A. Practical proposition, yes; but the effect on two elevations would have been somewhat different with the rise of the river.

[fol. 172] Q. When you put flashboards on this easterly or lower section of the Federal dam it serves to raise the elevation on that side to 17.2, you have accomplished an increase of four feet over the old State dam, haven't you?

A. Yes, to the extent which the flashboards raise the level in the pool.

Q. For half the year, that is in the winter period, you have raised the pool four feet if you keep those flashboards on?

A. No, because you cannot keep them on in the winter.

Q. Now, it is true, too, isn't it, Colonel, that a boat drawing more than 12 feet cannot get out beyond that pool through either of those locks on the Champlain or the Erie?

A. That is true when the pool level is at 15.2.

Q. Whatever the pool level is, tows cannot get out of that pool and through Lock 1, Champlain, or Lock 2, Erie, if they draw more than 12 feet?

A. That is true.

Q. Because of the miter sills of the lock and the depth of the canal itself?

A. The depth of the canal itself is the controlling feature.

Q. The miter sills is too, isn't it?

A. Yes; but I should explain my reply by saying that shoals and water below standard level, and some arches of the canal above the locks we have mentioned, sometimes control.

Q. When you left Lock No. 2 on the upstream side of Lock 2, Erie canal, if you had drawn more than 12 feet of water you could not get out of the lock?

A. No.

Q. And that is true of Lock No. 1, Champlain?

A. Yes.

Q. And of each other lock on the canal system?

A. Yes, sir.

[fol. 173] Q. The Federal Government then excavated the channel which you have described, from the Federal dam north to the point where the north sprout of the Mohawk enters the Hudson?

A. Yes, sir. If I remember correctly, to the point at which the western division of the Barge canal leaves the river. They excavated over that distance to the extent that it was necessary to get the depth and width.

Q. Now, you heard the witness Wiseman testify about a channel on the easterly side of the river?

A. Yes.

Q. That channel is the old channel which was formerly used when the State dam was in operation, isn't it?

A. As I understand it was the channel properly used by the Erie canal boatmen before the Barge canal was built.

Q. And in between that east channel which we will call the State channel, and the west channel, which is the Federal channel, you know that south of the Twelfth street bridge there is an old submerged island?

A. There is a kind of shoal in there.

Q. And that extends for some distance along the river?

A. Yes.

Q. And that runs in between these two channels?

A. Yes.

Q. Don't you know, Colonel, that the depth of the water at that point is only about three or four feet even when the pool is at 15.2?

A. I don't remember. I will refresh my mind from a record that I have. That is not true as a whole but for a relatively short distance along the crest of that shoal between the two channels it is as little as four or five feet.

Q. That is, the elevation of the top of that island there is about twelve or eleven feet, Barge canal datum?

A. No. Some points on it, where there is only four or [fol. 174] five feet of water, when the river level at the crest of the dam is 15.2.

Q. Now, if you added a two-foot depth over that island you would not get the required twelve feet draft, would you?

A. No.

Q. And you know from your experience in that section that boats which have gone aground south of Twelfth street, which Capt. Wiseman referred to, have gone aground on that island or submerged shoal?

A. I cannot speak as to my own information on that. If they got out of the channel, either one of those channels, they would be likely to go aground on that shoal.

Q. Are you familiar with where the Shaughnessy ice houses are or used to be?

A. I don't remember them by name. I was familiar with some that were on the Troy bank a short distance above the Troy dam. You mean the ones that were burned?

Q. Yes. And wasn't it opposite that point that these boats had their troubles?

A. I couldn't say—if the shoal is opposite that point.

Q. That is the point where those shoals were?

A. I don't know the location on the map of the Shaughnessy ice houses, so I could not say.

Q. Give me the general location of the shoals on your map?

A. Referring to the map on which is shown the results of the United States survey of 1923, I find that the shoals, or the shoal referred to by your question, is opposite the Shaughnessy ice houses, which are marked on this map.

Q. You were in court yesterday?

A. Yes.

Q. Did you hear Capt. Wiseman testify that that was where the boat ran aground, opposite Shaughnessy's ice houses?

A. I heard it if I was here, but it did not make any great impression on me.

[fol. 175] Q. You also testified that it was planned in designing the course of the Ford tailrace south of the Federal dam, to bring the tail water around on the westerly side of Adams island so it would not cause eddies when it went into the excavated channel of the river?

A. The most important changes that were made by the district officer in the Ford plants as first submitted to him informally by Stone and Webster was to change the direction and dimensions of the tailrace of the power plant so as to direct the discharge from the tailrace further down the stream and thereby accomplish the result of discharging all or as much as possible of the water in the westerly channel so as little as possible of it would escape across the shoal to the north, or upstream, to Adams island.

Q. That was the plan that was attempted to be carried out?

A. It was.

Q. And it was not carried out very well?

A. It was carried out as planned.

Q. The results were not what you expected?

A. It was not expected that those results would be complete.

Q. As a result of that Ford tail water coming into the channel there are marked eddies south of the Federal lock, downstream from the Federal lock?

A. There is some water which now escapes from the Ford tailrace easterly and finds its way into the channel and north of Adams island.

Q. And that does cause eddies?

A. I don't know. I have not observed any, but it causes some cross currents.

Q. And there to that extent it impedes navigation at that point.

A. Yes; but much less than as though water was going over the auxiliary spillway.

Q. I understand you to say that the fact that the water was discharged over the auxiliary instead of the whole dam [fol. 176] caused some inconvenience to navigation?

A. I want to correct my reply; from auxiliary to main spillway. I should have said main spillway.

Q. I understand you to say that the discharge of this water over the main spillway alone instead of over the entire dam caused some inconvenience to navigation?

A. I would not put it that way; but that the discharge of the water over the main spillway, particularly causes inconvenience to navigation in the dredged channel downstream from the lock.

Q. Didn't I understand you to say if the main spillway were raised two feet that the water would be spread evenly over the entire dam, that the inconvenience to navigation would be avoided?

A. I did not say that, because that is not the fact. As a matter of fact, one of the reasons for designing the dam with a main spillway and also an auxiliary spillway, was that by getting a relatively greater discharge over the main spillway than over the auxiliary spillway, your discharge over the main spillway flowing directly downstream would have a greater tendency to carry the water straighter downstream and past the lower channel at the locks than if it came across the entire length of the dam evenly.

Q. To carry it over the spillway straight down the channel of the river?

A. As far as could be accomplished.

Q. This auxiliary spillway which was diagonally across the river, causes a cross current when water is passing over it?

A. It has a tendency to that effect. But in designing the dam——

Q. So far as the water goes over the auxiliary spillway that produces cross currents?

A. It tends to produce cross currents.

[fol. 177] Q. Which in themselves are detrimental to navigation?

A. Yes, so far as they find their way into the lower entrance channel.

Q. They cannot do anything else?

A. Yes; they may be operated from the lower spillway when the result would be modified.

Q. The only effect of the main spillway is the manner in which the current is straightened out?

A. That was one of the ideas in designing the location in that way. The river is not as wide as it was at the State dam.

Q. The idea of the discharge over the main spillway at the lower elevation is to straighten out your current down the river?

A. That is correct.

Q. When you get half of the discharge over the main spillway you eliminate that straightening effect?

A. Yes, to that extent.

Q. Now, I understood that you testified that flashboards helped navigation above the Federal dam?

A. Yes, sir.

Q. And I understood that that aid to navigation resulted entirely from the deepening of the water above that dam?

A. Not entirely from the deepening of the water. A reduction of the strength of the current and a decrease in its effect upon the direction of the currents.

Q. This decrease in the strength of the current, I understood you to say, resulted from an increase in the cross section, isn't that correct?

A. Substantially so.

Q. So as a matter of fact that decrease in the current is obtained entirely by deepening the river, increasing its depth?

A. Substantially so.

Q. And therefore the water proceeds more slowly?

A. Yes.

[fol. 178] Q. So that advantage to navigation is gained entirely by deepening the water or raising the elevation of the pool?

A. Yes.

Q. And if you have not raised the elevation of the pool you have not aided navigation in that effect?

A. No.

Q. You said also that there was some benefit to navigation by reason of the fact that you can get deeper water in the channel?

A. To the extent that you did get deeper water.

Q. And you get the deeper water along the shoals?

A. Yes.

Q. Isn't it a fact that your statement that these flashboards were a benefit to navigation, is based entirely upon the fact that they do raise the elevation of the water above the Federal dam?

A. Yes, to the extent that they do raise it above the Federal dam.

Q. And in your opinion the raising of that elevation of that water is a benefit to navigation?

A. Yes, sir.

Q. Now, were you present in court all day yesterday?

A. Yes, sir.

Q. And did you hear us talking here about the—or did you hear Mr. Wiseman talking about a decrease in the elevation of that pool by the operation of the Ford plant?

A. I heard the testimony and discussion on that subject, yes.

Q. And you understood the claim to be made that the operation of this Ford plant, by drawing water to its wheels tended to decrease the elevation of the pool above the Federal dam?

A. At times, yes, I believe that was under discussion.

Q. So that the extent that the Ford plant did draw the water down in the upper pool it was a detriment to navigation, wasn't it?

A. I should not put it that way, because of the rules under which the plant is operated, provided the water being down below pool level 15.2; but I would say that it de-
[fol. 179] creased the benefits which would be derived from the elevations due to the flashboards.

Q. I am not talking about flashboards. Do you understand the effect of the operation of that plant is to pull down, decrease the level of the pool above the dam?

A. Yes.

Q. And to that extent it is a detriment to navigation, isn't it?

A. No. I told it as I have stated already. It reduces the benefits which accrue from increased depth rather than being a detriment to navigation.

Q. Then if the Ford Company pulls down the pool it is not a detriment to navigation but if they push the pool up by flashboards it is a benefit to navigation?

A. It would reduce the——

Q. You testified that when the Ford Company raised the pool by flashboards and got more power that that was a benefit to navigation?

A. Yes.

Q. That when they pulled the pool down that was no detriment to navigation?

A. If you insist upon putting it that way, yes.

Q. Did I understand you to say that the discharge over this main spillway tended to produce a cross current in the pool above the Federal dam?

A. I said that the current above the dam on the east side of the river crossing above the upper entrance channel to the lock, crossed diagonally over that entrance channel and so on towards the crest of the dam, especially of the main spillway.

Q. So that in your opinion that cross current is detrimental to navigation?

A. It causes difficulties, yes.

Q. Did you have any part in designing that dam?

A. No.

[fol. 180] Q. The engineers must have known that there would be a cross current there?

A. They probably expected some, yes.

Q. And in any lock to a dam, there must be a cross current so long as there is any water flowing in the river?

A. No. You may sometimes find a location for a lock in which you can avoid those currents, and that object is always sought to be obtained, wherever possible.

Q. You have a situation wherever you have a lock in a dam in a river, where there is water passing over the dam and no water passing through the lock?

A. Yes.

Q. So there is bound to be a current across in front of that lock, or past the lock in one way or another?

A. Yes; but it is sought to be reduced as far as possible by finding a suitable location.

Q. When the Ford plant commenced operations, that tended to draw the water of the river, or so much of the river as is used across the river, to the westerly side, didn't it?

A. Yes.

Q. And to that extent it produced a cross current directly across the channel?

A. No, because it would draw its water from further upstream.

Q. The channel further upstream?

A. All the water don't go through the channel, it goes through the whole river.

Q. The channel is only 200 feet wide? When the water is pulled over the main spillway it does produce a cross current but when it is pulled through the Ford plant it does not produce a cross current?

A. The natural trend of the flow of the current, normal conditions at the Federal dam, is along the easterly bank of the river above the lock, and as it approaches the lock it flows somewhat to the westward of the direct line of the [fol. 181] river, thereby crossing the entrance channel at a slight angle and finding its way onto the dam.

Q. That current, or the nature of that current, resulted from the old State channel?

A. No, from the natural conditions of the flow in the Hudson river.

Q. Prior to any Federal work being done in that river the only channel was on the east side, and built by the State of New York a hundred years ago?

A. The scope of extent of the channel does not indicate the extent of flowage—by channel meaning the navigable channel.

Q. When the Federal Government constructed a channel 200 feet wide and 12 feet deep, on the westerly shore, do you want to testify that that did not change the nature of the current in the Hudson river?

A. Changed it to a very inappreciable extent because the channel straightened around on the west shore. It proceeded upstream diagonally across the river at a very slight angle, and moreover the extent to which that channel marked the cross section by excavation of the bottom of the river was very small. The amount of work done to produce a depth of 12 feet or 200 feet was relatively small.

Q. Referring to Plaintiffs' Exhibit 2, the natural channel above the Federal dam is indicated by two parallel lines running from the Federal dam up the Hudson river, wasn't it?

A. There is a channel indicated on that map by two such lines but that is not an accurate representation of the Federal channel as approved by the Federal Government.

Q. Have you one that is more accurate?

A. I have. That seems to be taken from the State Barge canal map prepared and issued for the purpose of navigation for the general public, and not such as would be used for the making of the improvement itself.

[fol. 182] Mr. O'Connor: I ask that this map be marked for identification.

Marked Plaintiffs' Exhibit No. 19 for identification.

Q. Will you look at this map No. 19 for identification? The channel is marked on this map by parallel lines 200 feet apart?

A. That is the projected Federal channel.

Q. Is that the channel that was built?

A. Yes, sir.

Q. Now, that channel commences with the Federal lock at the State dam?

A. The upper entrance to the lock.

Q. And from that point it proceeds in an absolutely straight line to the westerly, to within 100 feet of the westerly shore of the river, does it not?

A. Yes; just below the fifth branch of the Mohawk river.

Q. So that the channel upon leaving the lock on the easterly side of the river goes directly across the river to the westerly—diagonally across the river to the westerly side?

A. Yes, sir.

Q. In a straight line?

A. Yes, to the point mentioned; at a point about 300 feet to 350 feet downstream from the lower side of the fifth branch.

The Court: Is that what is known as the fifth branch of the Mohawk?

A. Yes, so known on the Government map.

Mr. O'Connor: How far is it from the northerly end of the northwest wall of the Federal lock to the point where the westerly side of this channel approaches the east shore by approximately 100 feet, or approaches within 100 feet of the westerly shore?

A. Approximately, 2,000 feet.

Q. Now, at that point, or throughout that stretch of 2,000 feet the current of the river is diagonally across that channel, is it not?

[fol. 183] A. In a general way, yes; although the currents are irregular in that section, one side of the river to the other. They do not flow uniformly as to direction across the entire width of the river at that point. In other words, the current on the west side of the river does not follow the same direction as the current on the east side does.

Q. When you pull the water of the river down the westerly side into the plant of Henry Ford and Son, you produce a current directly across that channel, don't you?

A. Yes, to some extent.

Q. You have it to the extent that you use the water?

A. Well, to some extent.

Q. And to that extent the plant is a detriment to navigation?

A. Not necessarily because the current of that section of the river is very light, the currents are not strong. I am speaking of low-water conditions. Under normal water conditions a tow would have very little difficulty in going across them at a slight angle; but when it comes to entering the narrow entrance to the lock past the upper end of the west guide wall that same current which is objection-

able only to a minor extent in an open channel is still more objectionable and the current is stronger into the concave banks of this shape than it is in midstream or across the river in the convex bank.

Q. Wouldn't you avoid all those troubles that you complain about and which you claim the flashboards have remedied if you had built that Federal dam to 15.2 all the way across?

A. No.

Q. Then you don't correct those conditions by raising the dam with the flashboards to 17.2 all the way across?

A. I don't get the question.

Q. If I understand you correctly, the difficulties of which you complain result from discharging the water in this river over the main spillway close to the lock?

A. Yes, partially result from that.

[fol. 184] Q. To any substantial amount?

A. Yes, to this extent. The currents which discharge through the main spillway are during low-water period and the currents are relatively weak, at certain normal stages. When the discharge is over the whole length, the currents are much stronger due to the great amount of water and at that state of affairs the spillway comes into effect throughout its whole length and you get the effect that was considered at the time the dam was designed and with a view of reducing those currents to the maximum extent possible. The strength of the current results largely or to a great extent from the increase of the flow of the river. The difficulty at the lower entrance——

Q. We are talking about the currents above the lock: I had the idea that the so-called notch in the dam tended to produce a current near the northerly approach wall?

A. That might be said, yes.

Q. That is not part of your idea of the benefit of these flashboards?

A. The flashboards to the extent to which they reduce the amount of water pouring over the dam, whether over the low or high spillway, reduces the current in the lower approach channel.

Q. Do you mean to say they could not reduce the amount of water going over the dam?

A. They reduce the amount of water going over the dam to the extent that they open it and permit the Ford plant to draw it.

Q. You do not think the fact that the Ford plant is pulling that water from the east side of the river where the current is, diagonally across to the west side, produces any detriment to navigation?

A. I say to the contrary. It produces results very beneficial.

Q. To pull the channel of the river direct across that channel?

A. Yes, to pull it from a distance upstream at the lock. [fol. 185] By pulling the water in the head channel 2,000 feet upstream it takes that much water——

Q. Didn't I understand you to say that the current was down the east bank?

A. I said there was such a current along the east bank. I did not intend to say that all the current was along the east bank.

Q. So you are pulling that right over to the west side to the Ford channel?

A. By reducing the amount of water coming along that bank—that is a concave bank.

The Court: As I understand, the westerly section of this Federal dam is two feet highr than the easterly?

A. Yes, sir.

Q. What is the reason or purpose underlying the construction of the dam in that way?

A. The old State dam was built 1,400 feet below the Federal dam where the river is about 1,200 feet wide and had an overfall the whole length of it, or 1,200 feet. The locations available for the building of a new dam were limited and the one selected for various reasons, for building this new dam 1,400 feet above the State dam, was at a point where the river was narrow, and therefore the same length of dam could not be obtained. With a shorter length crest as the river rises you would get a greater height of the river over the dam. To increase the length of the dam it was necessary to give it some shape different from a dam straight across the river; and after studying various plans affecting the state of the dam, this present dam was adopted. The dam in the main spillway section or 600 feet

proceeding directly across the river and the auxiliary spillway section further westerly angling across the river downstream until a sufficient length crest was developed. It was primarily to develop a length of crest which would avoid increased freshet height which necessarily would follow from a shorter crest.

[fol. 186] Mr. O'Connor: You have not as yet answered the judge's question.

A. I thought I did.

Q. Why was the westerly section of the dam raised two feet above the easterly section?

A. By reason of the desired effect of such an elevation upon the direction of current below the dam.

Q. Wasn't that raise of two feet only to provide an entrance for a power-house?

A. Not to my knowledge. I would like to add to the prior answer. I cannot answer as to what all the other intentions were.

Q. You cannot say why it was raised two feet higher or four feet higher than the old State dam?

A. Partially I can. It was to permit a greater flow over the lower easterly section, which is called the main spillway, than over the more westerly section.

Q. It is desirable to have a greater flow over that easterly section?

A. Yes, to produce a stronger flow.

Q. And when you put the flashboards on you destroy that effect?

A. Yes.

Q. So the presence of the flashboards destroys that effect?

A. I was going to explain that answer. It being desired particularly to obtain that effect, as the river rises and reaches an elevation where it discharged over the whole westerly section—by inducing a relatively strong flow over the lower easterly section, then as the river raised and began to discharge over the westerly section, the greater volume of water proceeding straight downstream would have a greater effect in deflecting and continuing in a straight run down the river the water running over this westerly section which discharged partially diagonally

across the river. It is very difficult to explain without a map and plans.

Q. Isn't it a fact that the design of that dam two feet higher was to produce a strong current straight down the [fol. 187] river—so a greater overfall would be discharged down the river?

A. At freshet stages.

Q. And you destroy that benefit when you put these flashboards on—eliminate that notch?

A. No; because the flashboards are only put on the dam at low stages, and under the permit by which they are authorized are supposed to go out at the time the river reaches what is known as a low-freshet stage. Flashboards are supposed to go out at 18.5 E. D. datum, which would be 19.37 B. C. datum; and at that stage of the river it is just reaching a low-freshet stage.

Q. At that stage of the river there isn't much navigation is there, on that river?

A. There could be as between the river below the dam and the pool just above the dam.

Q. There is no navigation at that time?

A. That is a flood of only four feet above the crest of the dam and the Federal lock is designed for navigation up to e. d. datum 24.87. E. D. means engineers department datum meaning sea level at Sandy Hook.

Q. Referring to Plaintiffs' Exhibit No. 2, which shows the Federal dam in a broad white line?

A. Yes.

Q. That dam has approximately the same length as the old State dam which is marked on the same exhibit in black ink?

A. Approximately the same length of crest.

Q. And that greater length is obtained by making it elbow shape?

A. Yes, accepting your description as a sufficient description of the plan of the dam.

Q. The spillway of the new dam in the lower stages of the river is only about half the length of the spillway on the old State dam?

A. Yes, approximately. The main spillway which has an elevation of 15.2 is just short of 600 feet long.

Q. Now, as I understand you, the design of that dam had this in mind: that in low stages of the river, all of the water [fol. 188] would pass over the lower spillway, main spillway, which is at right angles across the current of the river?

A. At low stages, yes.

Q. And that would pass directly down the river parallel with the wall of the lock, so that it would be parallel with the course of boats coming out of that lock, is that correct?

A. That is substantially correct with regard to the flow past the lock. I might add that the design in that shape, that that result was influenced somewhat, influenced considerably, by the fact that during the greater part of the navigation season, from May 1st, until November, the river is at a low stage and a greater part of the flow goes over the main spillway.

Q. Now, the idea of that was, when the water came over this diagonal section, that is, the portion of the dam which runs more or less downstream and which water would go over in a cross current across the river, it would be corrected by the direct flow coming over the lower spillway?

A. Whenever it was possible to correct it in that way, yes.

Q. And that was the purpose of the lower spillway on the easterly side?

A. If that object was in view.

Q. Was there a correctional effect by having a direct current down the river, having a cross current across the river?

A. Yes, especially at freshet stages.

Q. If you put flashboards on that easterly section so that you have a dam say 17.2 all the way across the river—and assume that condition—that correctional effect is gone from 17.2 up until the flashboards fail, isn't it?

A. Yes; assuming that there is no water going over the flashboards.

Q. From the point where the river starts to flow over 17.2 elevation?

A. And that same amount of water was going over the dam as would have gone over if the Ford plant had not been in operation.

[fol. 189] Q. It doesn't make any difference whether the Ford plant is in operation or not?

A. It does make a good deal of difference in answering your question.

Q. Assuming that the Ford plant is in operation or not, whichever you prefer to have it?

A. We will assume that the flashboards——

Q. No, will you assume that the Ford plant is operating or not operating? The Ford plant is operating and the river is at a stage of 17.3 which is one-tenth of a foot over the flashboards at that particular stage of the river, the correctional effect resulting from this design of the dam is entirely gone and destroyed by the flashboards?

A. Yes, so far as it has that effect at that stage. But only a tenth going over it would not produce enough to be objectionable.

Q. That is too low a stage to make any difference?

A. Yes, to carry enough water in the overfall to make any great difference to navigation.

Q. Any point from 17.2, the correctional effect of this design of dam is destroyed by the flashboards up to the point where the flashboards finally kick off?

A. No, partially.

Q. It is not wholly?

A. No, because the flow over the flashboards has a correctional effect over the flow over the auxiliary crest which flows partly into the channel.

Q. The effect of the notching of the dam is gone?

A. That is evidenced from the fact that the flashboards make the same level.

Q. But the placing of these flashboards on the easterly side of the dam destroys entirely the correctional effect obtained by lowering that dam at any point when the elevation is above 17.2?

A. As long as the flashboards stand. The design of the [fol. 190] lower section of the crest of the dam was intended for its effect at all freshet stages from that point up rather than at the low-water stages.

The Court: When you speak of the easterly section do you mean the portion that runs at right angles to the lock?

Mr. O'Connor: Yes. I have been calling the other one

the diagonal section, which runs in the direction of the current.

The Witness: The main spillway being the section of the dam which is at right angles and the auxiliary being the section of the dam to the west of the first section, extending diagonally across the river downstream.

The Court: And what is the other portion of the dam known as, that runs substantially at right angles to the east bank of the river?

A. That is the powerhouse site. It has a dam in that too.

Mr. O'Connor: Did you hear the testimony that these flashboards were placed on the dam June 16th, 1925, and that they remained there intact without failure until July 23rd, 1925?

A. I believe those are the dates that I heard.

Q. I show you Plaintiffs' Exhibit No. 13 which gives the elevation of the water surface of the Federal dam for the year 1925, Barge canal datum, and I ask you to note the water elevations during the period from June 16th to July 23rd?

A. Yes.

Q. During that period while those flashboards were on this correctional effect on the current below the dam which you thought to obtain by lowering the main spillway was entirely destroyed by the presence of these flashboards, was it not?

A. It was partially.

Q. Wasn't it entirely destroyed during that period?

A. The correctional effect on the lower crest of the main [fol. 191] spillway, yes, because the crest of the dam was at the same level so long as the flashboards remained off.

Q. So that the correctional effect sought to be obtained by lowering the main spillway was entirely lost during that period while the flashboards were on?

A. The effect of the lower elevation of the main spillway, yes.

Q. During that period there was freshet stages of the river, weren't there?

A. The data on this exhibit shows the gauge readings in the pool with the flashboards up. It shows an elevation of roughly a foot and a half above the flashboards. I cannot

say that that would be called a freshet, it is a minor rise in the river.

Q. Take June 29th and 30th?

A. The readings are 19.7.

Q. On each day?

A. Yes.

Q. And at that time there was two and a half feet of water over the flashboards and over the auxiliary spillway?

A. Yes, sir.

Q. And on July 1st, there was 2.2 feet of water over the entire length of that crest?

A. July first?

Q. Yes.

A. Yes, 17.2.

Q. Don't you consider that two and a half feet of water over that dam is going to produce a pretty strong current?

A. Yes; it will produce some current below the dam.

Q. A pretty substantial current?

A. Moderate current.

Q. At that time something like 12,000 feet of water flowing in the river, isn't there?

A. I cannot say because I have not the data of the flow over the dam with flashboards on it.

Q. You don't know whether you would call that a freshet or not?

A. The beginning or what would be called a minor rise in the river. Freshet stages in the Hudson river, the gov- [fol. 192] ernment engineers recognize stages running from a discharge of 40,000 to 60,000 a second, feet, ordinary freshet.

Mr. O'Connor: I would like to offer the map which the witness produced.

Received and marked Plaintiffs' Exhibit No. 19.

Redirect-examination by Mr. Nichols:

Q. You stated in answer to Mr. O'Connor, the flashboards were used on the old State dam during the summer months, is that correct?

A. Yes, sir.

Q. And would flashboards be used on the Federal dam approximately the same period of the year?

A. Yes, if they were used at all.

Q. Is there some navigation in the pool above the Federal dam which does not pass into the Barge canal?

A. Yes.

Q. Between Waterford and points below the Federal dam?

A. Between the Federal dam and points in the pool up to Waterford.

Q. And also between Waterford and Troy and Albany and other points down the river?

A. Yes.

Q. And some of that navigation does not pass into the twelve-foot Barge canal, is that correct?

A. That is correct.

Q. Now, you stated that opposite the Shaughnessy ice houses on the west side, where they used to be on the west side of the river, the depth of the channel was approximately four to five feet at times?

A. I stated that the minimum depth of the shoal which exists at that point was approximately five feet.

Q. What would be the effect of placing two foot flashboards on the dam, on the depth of water over those shoals?

A. It would increase it to the extent the water was raised in the pool.

[fol. 193] Q. If the flashboards raise the water two feet in the pool, the channel would be increased from four to five feet to six to seven feet, is that correct?

A. That is correct.

Q. There are certain eddies or cross currents in the channel below the dam, is that correct?

A. Certain cross currents in the entrance channel to the lock below the dam; that is diagonally across, not straight across.

Q. Are those eddies or cross currents increased or decreased by operating the defendant's plant?

A. They are decreased to the extent to which the defendant's plant uses the flow of the river.

Q. And is the reason for that because the water is discharged in the tail race on the west side of Adam's island?

A. It is.

Q. Any cross currents which were produced by water passing over the auxiliary or more westerly spillway existed before the power plant operated, did they not?

A. They did.

Q. You stated that the construction of the dam produced certain straightening effects in the current above the dam?

A. Yes; that was the idea of constructing the dam in its present shape and in giving to the crest of the dam the height it is.

Q. What effect has the discharge of water through the defendant's power plant upon that straightening effect?

A. It enhances the straightening effect to the extent that the power plant draws water from the river and therefore reduces the amount of water passing at stages above 17.2 over the auxiliary spillway.

Q. Referring to Plaintiffs' Exhibit 2. The direction of the current above the Federal dam is diagonally across the navigation channel, is that correct?

A. It is diagonally across the upper entrance channel to the lock and on that side of the river.

[fol. 194] Q. Where the navigation channel enters the lock above the dam?

A. Yes, sir.

Q. In pulling water through the defendant's power station, does that tend to increase or decrease the cross current in the channel?

A. It tends to decrease it which tends to pull the water to that side of the river and reduce the amount flowing across the upper entrance to the canal.

Q. When the water is relatively at low stages and passing over the main or more easterly spillway, does that produce certain currents diagonally across the north end of the lock wall?

A. Yes, since all of the discharge of the river is taken down at 600-foot width of the river that is occupied by the main spillway.

Q. In other words, the water is drawn along the west side of the river wall of the lock?

A. Yes; what was drawn to the east side of the river would pass over that 600 feet.

Q. What is the effect of placing flashboards upon the main spillway?

A. Upon these currents?

Q. Yes.

A. It reduces them.

Q. And why is that?

A. It increases the depth of the river and reduces the current generally in the river; and also through making a more even distribution of the flow of the river from bank to bank, by taking a part of the discharge after the flashboards are topped, by taking a part of the discharge over the auxiliary spillway.

Q. So that between the point elevation 15.2 and 17.2, with the flashboards on, there is no flow adjacent to the lock?

A. No; there would be no flow except through the tail-races of the defendant's plant.

Q. And does that tend to improve the current conditions above the lock?

A. It does.

[fol. 195] Q. You stated to Mr. O'Connor, when the defendant's plant is operating it tends to decrease the elevation of the pool above the dam?

A. Yes, sir.

Q. What is the effect of placing flashboards upon the dam?

A. It tends to maintain a higher elevation off-setting the drawn-down effect of the draft of the defendant's plant upon the pool above the dam.

Q. If the elevation of the pool without the defendant's plant operating and without any flashboards on the dam is 16 feet and if the defendant's plant is operating and flashboards are placed on the dam, how does the elevation of the pool compare with what it was before?

A. It would be lower with the plant operating and with the flashboards up to an elevation of 16 feet. If it was 16.2 with no flashboards and with no plant operating and then you put up flashboards and operate then you pull it down below 16 feet.

Q. And the more water that is passed through the plant, the more the pool is drawn down?

A. Yes.

Q. You stated that the operation of defendant's plant produced certain results upon the currents in the river. If flashboards were placed on the dam are those results increased or decreased?

A. They would be increased.

Q. Over any period of time which the flashboards might be on?

A. Yes, sir.

Recross-examination by Mr. O'Connor:

Q. In response to Mr. Nichols' question you assumed an elevation of the river of 16 feet?

A. The question assumed the elevation.

Q. And you assumed it in your answer?

A. I answered the question based on that elevation.

Q. And how much water is flowing in the river at that time?

A. Without flashboards?

[fol. 196] Q. Yes.

A. Something less than 5,000 feet, if I remember the figures. I haven't the figures of the rating table in my mind; but approximately 16 feet, being .8 of a foot above the crest of the dam. At 15.2 it would probably be about 2,000 second feet.

Q. In answering Mr. Nichols' question did you assume there was a flow of 2,000 feet in the river at that time?

A. I did not assume any flow.

Q. How much did you assume in answering Mr. Nichols that there was flowing through the Ford power plant?

A. Whatever the Ford power plant needed and was permitted under its permit.

Q. How much in cubic feet per second did you assume was being drawn through the Ford power plant? A. I did not assume anything.

Q. How can you say that the river was lowered?

A. Because any amount that the Ford power plant would draw under those conditions would pull the river down.

Q. Over what it would be if they did not pull it down?

A. If they did not use it.

Q. You mean if there were flashboards on the dam and the Ford plant was operating it would tend to pull the water down?

A. Yes, as compared with conditions when they were not operating.

Q. Do you mean to testify that at the particular point when the river is at 16 feet the Ford plant would pull the water down as much as the flashboards raised it?

A. The question as to the amount that the flashboards raised it did not come in.

The Court: Did you assume that in your answer?

A. Yes. I assumed that the plant being in operation and knowing the capacity of the plant in a general way, as to its draft upon the river, the maximum capacity being 6,500 [fol. 197] cubic feet a second, if the plant were operating and only 16 feet in the pool, when they put flashboards on the Ford plant, to the extent it used water, pull the level down below 16 feet.

Mr. O'Connor: So that in your question you did not assume any difference?

A. That was based on the level of 16 feet.

Q. Your answer was simply this, as I understand you: You meant if the Ford plant were operating it would tend to pull the pool down whether operating or not operating?

A. I answered the question as to a condition with flashboards and compared it in operation without flashboards.

Q. Suppose a flow of only a 100 feet a second and a flow in the river of 2,000, you would not have pulled the pool down?

A. A small reduction. But the plant would not operate on a hundred feet per second.

Q. You did not assume any specific amount?

A. Of flow through the Ford plant—no.

Q. I show you elevation of the water surface of the Federal dam, Exhibit 13, and ask you how many times the water reached the stage of 16 feet in the past year; how many times the water was 16 feet or less.

A. All of January; February 1st to February 10th, inclusive; June 12th, June 15th and 16th.

Q. Those were the days they put the flashboards on?

A. I believe it was so testified.

Q. And they had to pull the water down to get out on the dam?

A. I am not aware of that fact.

Q. That was the day they repaired the flashboards?

A. I am not aware of that fact.

Q. The only times that the water reached an elevation of 16 feet during the period that those flashboards were on was August 14th?

A. Naturally with the flashboards on—the flashboards extending to 17.2.

[fol. 198] Q. They would keep the water at 17.2?

A. Yes.

Q. So that this question which Mr. Nichols has just asked you is purely an imaginary one?

A. I don't so concede it.

Q. You do not find any record of any such situation?

A. Last year?

Q. Yes.

A. No. There was only part of the year in which that table, that exhibit, gives the elevations of the pool above the dam without flashboards, and that is particularly so during the summer or dry season.

Q. Have you ever operated a power plant?

A. No.

Q. Would you think it good judgment to put two-foot flashboards on and then not keep your water to the top of them?

A. I am not competent to answer that question, particularly without a full knowledge of the water conditions.

Q. At any rate you do not want to say that the elevation of the pool will be lower with flashboards and plant operating than it would be without flashboards and without plant operating?

A. I did not make any such statement. I answered a specific question.

Q. As a matter of fact it would be higher?

A. I can't say. It depends on many conditions affecting the levels in that pool.

Q. And you have not made any study about that?

A. I have not.

The Court: Is that assumption of 16 feet something that in fact does not exist?

A. No. Very frequently the elevation of the pool above the dam without flashboards is in the neighborhood of 16 feet during the dry or low-water season of the year—particularly during the dry season. Last year was a relatively wet season with relatively high stages for that period of the year. I cannot give offhand the discharge as shown by the rating tables for a stage of 16 feet, but the estimate [fol. 199] I made in my mind with eight inches of depth

over the crest of the main spillway was about 2,000 second feet.

Mr. O'Connor: With the flashboards didn't you say the pool would be lower than 16 feet?

A. I did not make any such general statement.

Q. With flashboards on, the level of the pool would be less than 16 feet?

A. The plant in operation.

Q. The level would be less than 16 feet?

A. Yes; the plant would pull it down below 16, if that were the level of the pool without flashboards.

Q. Then the pool elevation with the flashboards would be less than 16 feet?

A. Yes, with the plant in operation.

Q. But you could not find any such thing on this sheet?

A. During the dry season of last year, the boards were continually on the dam from June 16th, to some day in October.

Q. Why is it that after June 16th we do not find any elevation of the river below 16 feet?

A. Partly accounted for by the existence of flashboards.

Q. Does this navigation in the pool above the Federal dam take any merchandise beyond that pool?

A. I cannot state now. The best evidence was given by one of the witnesses yesterday.

Q. All he said that boats sometimes docked at Shaughnessy's ice house?

A. Yes.

Q. He did not say that they unloaded anything there, did he?

A. He did not say.

Q. As a matter of fact, you don't know of any person who takes any merchandise off of a boat in that pool?

A. I am not familiar with that. When I was in contact with it there was some navigation to local points in that pool.

[fol. 200] Q. Give us one instance of it?

A. A lot of rags put into some storehouse.

Q. Wasn't that the famous schooner that could not go by the Twelfth street bridge, and they had to bring it back to New York?

A. I don't remember that.

Q. And they brought a lot of old army garments and they were going to put them in the brewery?

A. I don't remember how the cargo came to be there.

Q. You remember it got stuck at the Twelfth street bridge?

A. I don't remember that incident.

Q. That is all that you can remember?

A. The only one of which I have a distinct recollection, of the specific incident.

Q. These flashboards were never put on the dam from the time it was built until 1925, were they?

A. So far as I know.

Q. A period of ten years?

A. Yes, sir.

Q. And during all that time the river was navigated by boats?

A. Yes, during the navigation season.

Mr. Nichols: During that ten years was there any power plant operating at the Federal dam until the defendant's plant was started operating in 1923?

A. There was not. There was a small amount of water used through the turbines of the lock itself for furnishing operating power. That amounts to nothing.

Mr. O'Connor: So the flashboards were only put on in connection with this power plant?

A. So far as I know.

The Court: So that without the power plant there was no necessity for flashboards?

A. Not for navigation purposes because the government dam was designed to be sufficient under normal conditions for navigation purposes without flashboards.

[fol. 201] Edward H. Sargent, called as a witness by the defendant, sworn, direct examination by Mr. Nichols, as follows:

Q. Where do you live?

A. Albany.

Q. What is your business?

A. I am chief engineer of the Hudson River Regulating District.

Q. Are you a civil engineer by profession?

A. I am.

Q. And you have been practicing your profession for some time?

A. Approximately twenty years.

Q. Were you formerly in the employ of the State of New York as civil engineer?

A. I was.

Q. You said you were now chief engineer of the Hudson River Regulating District, what is that?

A. The Hudson River Regulating District is a public corporation, created in accordance with the provisions of article 7-A of the Conservation Law, and it is the purpose of the Hudson River Regulating District to create, to construct storage reservoirs, for the purpose of regulating the flow of the Hudson river and certain of its tributaries.

Q. And the flow created or to be created by that reservoir enters the Hudson north of the Troy dam?

A. Yes, sir.

Q. About how far north?

A. The general plan for the regulation of the flow of the Hudson river, prepared by the board of the Hudson River Regulating District and approved by the State Water Control Commission, calls for the eventual construction of sixteen different reservoirs at various points on the Hudson river and certain of its tributaries, all of which would be above the Federal dam at Troy.

Q. Did you as chief engineer of the Hudson River Regulating District prepare an assessment to be levied upon the owners of the water power extending from the Troy dam north to the proposed development of the Hudson [fol. 202] River Regulating District?

A. I prepared an assessment of the benefits, or prepared an assessment of the cost of the Sacandaga reservoir which would be levied in proportion for the benefits received. This assessment included not only the power plants located between the proposed reservoir and the confluence of the Mohawk and Hudson rivers, but included the municipalities which would be benefited as well.

Q. Was that assessment made in accordance with the provisions of the Conservation Law to which you have referred?

A. It was.

Q. What was the estimated cost of the improvements to be assessed against the various property owners?

Mr. O'Connor: Objected to as immaterial.

The Court: I will take the testimony subject to the objection. I do not think it is competent, but I am going to take it.

The Witness: $9,000.000. The total cost of the improvement was estimated at $9,000.000.

Mr. Nichols: Does that include the operating expenses for each year?

A. No.

Q. Was a portion of that cost assessed against this defendant Henry Ford & Son, Incorporated?

A. Yes, sir.

Mr. O'Connor: I suppose the objection applies to all this line of testimony?

The Court: Yes.

Mr. Nichols: What is the proportion of the cost assessed against this defendant.

A. $177,660.

Q. And what is the percentage of the total?

A. .01974; approximately two per cent.

[fol. 103] Paper marked Defendant's Exhibit No. 12 for Identification.

Q. Upon what head at the defendant's plant was that assessment based?

A. It was based on the assumption of an average crest head of 14 feet.

Q. And is it possible to have a 14-foot head at the defendant's plant without the use of flashboards on the dam?

A. I think there might be extremes—be times under extreme tidal conditions when that might be obtained; but over an average period of time it would not.

Q. Would the assessment levied against the defendant be less if no flashboards were used on the dam?

A. I think it would be. The reason I hesitate is because the board fixes the assessment and I do not——

Q. You are the man who fixed the head upon which that assessment was to be based, were you not?

A. I did.

Q. I show you Defendant's Exhibit 12 for identification and ask you if you prepared that map?

A. I did. It was prepared under my direction.

Q. Does that show the elevation at the defendant's plant of 16.3?

A. It does.

Q. Does that mean sea level or Barge canal level?

A. United States G. S. datum.

Q. What did you take as the average elevation of the defendant's tail water at the defendant's plant?

A. 2.3.

Q. A difference of what?

A. 14.0.

Cross-examination by Mr. O'Connor:

Q. Who told you that the Ford Company was entitled to maintain flashboards on that dam?

A. Mr. Merrill, secretary to the Federal Power Commission.

Q. Anybody else?

A. I have talked it over with some of the representatives of the Ford Company.

[fol. 204] Q. As a matter of fact you did, didn't you?

A. I think so.

Q. You talked with representatives of every company along the river?

A. No, sir. What we did—my staff of engineers made a survey of all power plants along the river and after we prepared what the board called a tentative assessment all the beneficiaries were notified and were given the data on which the assessment was predicated.

Q. When was that notice sent out?

A. I haven't the date with me. It was approximately a year and a half ago.

Q. About when?

A. I can only say the assessment was adopted by the board on January 30th, 1925.

Q. When were the complaints, if any, to be filed?

A. As I remember it was two or three months prior to this date that I have just given you; some time during 1924.

The Court: That is when you had your grievance day?
The Witness: Yes, sir.

Mr. O'Connor: How much less would the head of the defendant's be, without flashboards?

A. I have not made a careful study of that. I would say at least a foot less.

Q. With two foot flashboards?

A. Yes, sir.

Q. In ordinary low stages of the river the head of the defendant would be two feet more?

A. With flashboards.

Q. With two foot flashboards?

A. With a given amount flowing through the power plant, yes.

Q. You have two feet more head by reason of these flashboards?

A. Yes, sir.

Q. And did you make any figures as to what that assessment would be without the flashboards?

A. No, sir.

[fol. 205] Q. Were these companies required to consent to come under that act?

A. No, sir.

Q. You never saw any flashboards on this dam while you were making an investigation, did you?

A. I did not make the examination personally. It was men under my supervision.

Q. You have heard the testimony here that there were never any flashboards on there before June, 1925?

A. I heard some testimony. I would not want to testify to exactly that.

Dana M. Wood, called as a witness by the defendant, sworn, direct examination by Mr. Whalen, as follows:

Q. Your place of residence?

A. Belmont, Massachusetts.

Q. Your profession?

A. Civil engineer.

Q. With whom are you associated?

A. Stone and Webster, Incorporated, Boston.

Q. Since when?

A. August, 1910, barring about a year and a half during the war period.

Q. Will you state your professional experience?

A. I was educated in the public schools of Boston and Massachusetts Institute of Technology. I first entered the employ of the United States in the survey school as assistant engineer for a period of about three and one-half years. Following that I entered the employ of Stone and Webster, in August, 1910, and excepting for the period of about June, 1918, to September, 1919, I have been in their employ. I have been employed on stream gauging work here in New York State in connection with the work of Henry Ford & Son. I was engaged upon the preliminary investigations for the development of this plant.

[fol. 206] Q. Who had charge of the engineering features of the power plant at the Federal dam at Troy?

A. Stone and Webster, Inc., as agents of Henry Ford & Son.

Q. Are you able to give a description of the tailrace of the defendant's plant?

A. The channel was excavated from below the finally accepted site of the powerhouse in a diagonal direction across the river ending at a point in the main navigation channel about opposite the end of Adam's Island. This channel was excavated about 1,500 feet long and 220 feet wide, having a bottom elevation of minus six, mean sea level, or minus 5.13 Barge canal datum. It is an excavated channel, a considerable portion of it being in rock.

Q. The length of the tail race?

A. About 1,600 feet.

Q. Can you give me the drainage area involved by these waters?

A. The drainage area of the Troy dam is given in various government reports at about 8,100 square miles.

Q. In connection with the development of the engineering features of the defendant's case, there are various subdivisions of it. Perhaps it will be helpful in reading the minutes. The first topic is the Stream Flow studies in connection with the waters that pass over the Troy dam. You have made such studies?

A. I have, yes.

Q. And upon what have they been based?

A. Upon several different series of records. In the first place all of the upstream records at various gauging points on the river which might be directly applicable to this site.

Q. Are the upstream records taken at the points which are specified in the stipulation, Plaintiff's Exhibit 1?

A. Yes, sir. The upstream stations, the upper and lower Mechanicville stations, so-called; at Vischer's Ferry, later superseded by the Crescent dam, when the water flooded out the Vischer's Ferry section; the records directly at the [fol. 207] Troy site that have been used, consisting of the Federal records at the Federal lock. Since the power plant has been in operation, of the flow directly through power station.

Q. Are those what you call the direct methods of estimating discharge?

A. They are. If you wish a general description of the methods used I might say this: We have taken in the first place the theory that the discharge from the Mohawk would be represented by the Vischer's Ferry, later the Crescent dam records; and that from the Hudson by either the upper or the lower Mechanicville. There is some doubt as to the general accuracy of the latter two records. The two records being closely adjacent do not altogether substantiate one another. By adding the drainage areas of these two points, I might say, the area at Vischer's Ferry, 3,427.2, from the New York State engineer's record, Crescent dam, 3,493.33 square miles; at the upper Mechanicville station 4,500 square miles, and at the lower Mechanicville station, 4,570 square miles. Now, if you add the approximate drainage area of these two stations on the Mohawk and the two stations on the Hudson river together, you will arrive at a figure which is within about two and one-half per cent of the drainage area at the Troy dam. On account of the discrepancy between the upper and lower Mechanicville records, we had to make an investigation to determine just which was the most reliable record to use. We found that by using the upper station in conjunction with certain records at the Troy dam, we arrived at a figure which was approximately 50 per cent greater than the discharge indicated at the Troy dam; and by using the lower Mechanicville station we arrived at a figure correspondingly less.

So by averaging the upper and lower Mechanicville records we obtained a pretty fair indication of the probable flow [fol. 208] at Troy. Since the Troy dam was built in 1915 a record has been kept of the elevation of the pool above the lock.

Q. By whom?

A. By the Federal Government. The United States engineers have determined the rating of that dam, or the current, from their measurements in the pool. These ratings have been carefully studied in conjunction and use of the Geological Survey and United States army engineers, and a rating curve has finally been made up by us, Stone & Webster, which has been acceptable to the army engineers. This matter has been gone over, too, with the plaintiffs' engineer and a rating table has been agreed to in the stipulation of the flow over the dam with no flashboards. The period of 1915 and 1916 so far as the general stream flow record is concerned from observations directly at the Troy dam, is rendered considerably uncertain on account of the underpinning operations during the construction and immediately following the construction of the dam. So that stream measurements at the Troy dam, for each day in the year 1915 and 1916 are not considered reliable. Since that time they are very reliable up to the time that the Ford plant went into operation. We have used them as our general basis for stream flow for 1917 to 1922, when the Ford plant started operations, and prior to that we have made this calculation based upon averaging the records on the Hudson river and adding to them the corresponding record on the Mohawk, and in that way have produced a series of records from October 1st, 1913, to September 30th, 1925, representing a twelve-year period.

Q. What about the period back of October 1st, 1913?

A. We have in addition gone back into the early records from both the Mohawk and the Hudson rivers and have ascertained that working back further than 1913 would probably be misleading because of the construction of sev- [fol. 209] eral storage reservoirs and their resultant operations, and also the changes in the power plant situation on the two rivers. In addition to that, the records themselves become more unreliable as we go back in the earlier period

when the science was not developed to such an extent as at present. Therefore in arriving at a general conclusion as to the probable average of run-off on the Hudson, which we determined to be a little over 14,000 cubic feet per second, to be exact, 14,020, cfs., was our general average, we also determined for the twelve-year period that the average was about 13,500 cfs. In other words, the twelve-year period may be taken as typical of a very long term average, and in view of the uncertainties in some of the records is much more reliable for all purposes.

Q. I show you this table, this blue print, marked for identification—I offer it in evidence.

Received and marked Defendant's Exhibit No. 13.

Q. This document, Defendant's Exhibit 13, headed Duration Flow Table, Hudson river, N. Y., October 1st, 1913, to September 30th, 1920, shows what?

A. This is the usual engineering method employed for studying the question of stream flow in connection with power development. We arrange the occurrences in this fashion, tabling the number of days of occurrence against the different rates of flow. To make the point clear: take the year 1914. This means that there were 357 days of 1914 during which the flow was equal to or greater than 2,000 second feet. For ten thousand cfs. there were 118 days which the flow was equal to or greater than 10,000 cubic second feet.

Q. Flow where?

A. At Troy. This being a table developed for Troy.

[fol. 210] Q. One hundred and eighteen days in the year 1914. You also have a percentage of time for the year 1914 in the corresponding column at the right?

A. That shows the per cent of time, which is another convenient scale for showing the stream flow. In other words, we divide the year, usually considering the scale 100 per cent of the time to be the low water end of the curve when it is plotted, and a zero per cent of the time, the high water end of the curve. In other words, we divide the year in terms of per cent rather than days for convenience in calculation.

Q. And so on throughout the various years?

A. Until they finally get a total for the entire period, totalling the days for the entire period and after taking the same percentage scale which sums up the general river conditions for the twelve-year period.

Q. So the last two columns show the average percentage of time for the twelve years in question?

A. For the entire twelve-year period.

Q. Turn to the figures shown in the rectangle at the lower right-hand corner of Exhibit 13, under column "total," maximum cfs. 120,500. What is that?

A. That means that the average flow during the day of the highest water in those twelve years averaged 120,500 cfs. When we speak of cfs. we usually infer that the river flows at that average rate the 24 hours.

Q. Was this Exhibit 13 compiled from certain records?

A. It was obtained in the manner that I have described previously.

Mr. Whalen: I offer in evidence flow duration curve Hudson river, at Troy, N. Y.

Received and marked Defendant's Exhibit No. 14.

[fol. 211] Q. Exhibit No. 14 is what?

A. This is a table of curves marked flow duration curves. This curve shows the previously described table, the average for the twelve-year period being shown and marked as the average for twelve years, 1914-1925, inclusive. Just up above that is another curve, which shows, including the year ending September 30th, 1925, being a plot of the correspondingly headed column in duration of flow table previously submitted.

Q. That is Exhibit 13?

A. Yes, sir. As before mentioned, it is customary to plot the low water end of the curve at 100 per cent of the time, on the scale for 365 days, at the right. On the left we have the high water end. Reading this curve, as in reading the flow table, it means that at any point on the curve—we will say taking the point marked 50 per cent, that the flow corresponding was roughly about 8,000 second feet; meaning that that flow was available for 50 per cent of the time or for a corresponding number of days in an average year.

Off to the right of the curve the figure there shows the absolute minimum flow and off to the left of the curve we show the maximum daily flow of 120,000 cfs. We have plotted here the same information as on the duration table; but we have not plotted all of the individual years from 1914 to 1924—showing only the year 1925 as an individual year.

Q. On this Exhibit 14, what does the upper line show with respect to the average for the twelve years as to river conditions, being higher or lower?

A. It indicates that the year ending September 30th, 1925, was very much higher than the average year for that portion of the curve which is of the greatest importance to navigation or power use. To make the illustration even more concrete; you see for 80 per cent of the time it is nearly one [fol. 212] thousand out of four thousand, or 25 per cent higher flow for the year plotted.

Q. The next topic involves the rating tables of the Troy dam, Exhibit 15.

Received and marked Defendant's Exhibit No. 15.

Q. Will you please explain this exhibit?

A. This table represents the information from which we derived the rating table of the flow over the dam when flashboards were in place on the main spillway section. In the left column is shown the height or depth of water over the top of the flashboards. In the succeeding columns from 2 to 6, are shown standard determinations of the discharge over the flashboards. These are all experimental formulae and are matters of general information among engineers. In column 8 a study has been made of the previous columns and indicated so set down, to be adopted for this particular case. At the left portion of the exhibit is indicated the depth or height over the top of the flashboards. The figures indicate the discharge per foot for the length of the crest, a total of 586 feet, or the length of the main spillway crest with flashboards in place. The discharge is shown in the last column or column 9.

Q. For instance, the top row of figures, the height of the water above the flashboards is .1—column 8, shows what?

A. .08 of a cubic foot a second discharging over one foot length of dam.

Q. And you apply that ratio to the total length or 586?

A. We multiply each figure by 586, or the total length of the main crest, to obtain the figures in the last column.

Q. So 586 feet, the length of the main crest, you multiply by the figure given in column 8 and you find a corresponding result in column 9 opposite?

A. Yes, sir.

[fol. 213] Q. Exhibit 16—I offer that in evidence.

Received and marked Defendant's Exhibit No. 16.

Q. That is based upon what?

A. This exhibit is based upon the one previously described, the last one. In that the totals shown in column 9 of the previous Exhibit, No. 15, were carried forward into the flow column of this table, under the column headed total discharge 586 feet with flashboards, third column. At the left of this table we see the column indicating the gauge height or elevation of the pool above the Troy dam in feet, and the second column the height or depth of water over the flashboards. This third column carried forward from the previous exhibit and the next is a column derived from the rating table of the discharge over the main dam without flashboards, previously submitted as an exhibit.

Q. For example, tell what it means with respect to the conditions when the water is at a height of 18.2?

A. That 1,940 cubic second feet are being discharged over the main spillway and 1,830 being discharged over the auxiliary crest, or a total discharge over the entire dam of 3,770 second feet.

Q. The last column, 3.0?

A. That shows the total height above the main spillway crest, or elevation 15.2. With flashboards on there would be no discharge whatever over either the flashboards or the auxiliary crest.

Q. The third topic will involve the calculation of water discharge through the defendant's power station. You have made studies of that aspect of the case?

A. I have.

Q. State on what they are based?

A. In December, 1924, we made an efficiency test of the water wheels and generators in the Ford plant. The electric efficiency being based upon shop tests of the electrical equip-

ment, and the water wheel efficiency being determined by [fol. 214] Professor C. M. Allen, called the so-called Allen salt velocity method.

Q. Is that to which reference is made in subdivision D of paragraph 6 of the stipulation, Plaintiffs' Exhibit 1?

A. It is. The result of the test was worked into a series of curves which give the relation between any load in cup kilowatts on the switchboard at the plant and the corresponding output or discharge in cubic feet per second of the water wheel.

Paper received and marked Defendant's Exhibit No. 17.

Q. This exhibit headed average load at Green Island plant of defendant, shows what?

A. We have made a calculation——

Mr. O'Connor: I object to the exhibit. These are merely typewritten conclusions of the witness. I do not want to be technical. If we have the basis for cross-examination in court, I do not object. But I object to the witness putting in an average load for the whole year.

Mr. Whalen: Does it appear by the stipulation?

The Witness: To the extent that the plaintiffs have the right of examination of the original log sheet from which this came.

Q. On what is the Defendant's Exhibit 17 based?

A. Produced from power station records, mainly by Henry Ford and Son, as a basis for load conditions at the power plant. This summary has been made up from a study of the log sheets over every day in the two years' operation—1924 and 1925 up to the end of September, and shows by month the amount of load. These figures are the results of averaging the loads from the data available at [fol. 215] the plant, of operating records. The fourth column shows the total horsepower, and the next column shows that converted into kilowatts, being obtained by multiplying the previous column by .748. This shows that the average load in 1924 was 2,590 kilowatts. It shows that the average load for the next nine months, 1925, was 2,680 kilowatts. It shows further that the average flow through the power station was 4,810 second feet during 1924, and it was the same figure for the first nine months in 1925.

Q. Have you determined the maximum discharge through the power station for that period, without flashboards?

A. You mean the maximum discharge that the station would be capable of utilizing? I am not quite clear on your question.

Q. With the ordinary head of 13 feet without the flashboards?

A. Yes, I can give you that figure. At the normal head of thirteen feet without flashboards, each unit will discharge 1,870 feet per second, a total of 4,780 cubic feet a second.

Q. With flashboards?

A. Corresponding total discharge would be 7,750 second feet.

Q. The next topic is that of the so-called pond level duration curve. Have you made studies of that subject?

A. Yes.

Q. Upon what have they been based?

A. Duration flow curves and tables.

Q. That duration flow table is Exhibit 13?

A. Yes, and Exhibit 14 to curves.

Q. Also upon the rating tables?

A. Also upon rating tables and upon this average discharge through the station that I have just mentioned. The way we have attempted to get at this problem is to take the average discharge through the station. I might say here that all of my calculations are based upon averages. I am talking now on average conditions and with that in [fol. 216] mind I have taken this average discharge through the station, 4,810 cfs. as a starting point and have subtracted that from the total flow shown on the elevation flow tables. In other words, assuming that that amount of water was going through the power plant on the average; the balance of course would necessarily be going over the crest of the dam.

Mr. Whalen: I offer Exhibit 18 in evidence.

The Court: Received.

Paper marked Defendant's Exhibit No. 18.

Mr. Whalen: That duration table is based upon what?

A. Referring back to the original duration table and taking various percents of time from it, or from the curve,

we arrive at the second column headed flow, starting 67,500, 59,000 and so forth, down through the column. The discharge over the dam without flashboards, the height of the flow over the dam, is shown in the third column. In the event that there is no discharge through the power station and all flow passing over the dam no flashboards were supposed to be upon the main crest. The corresponding height that this water would reach is shown in the fourth column marked with flashboards. Whenever the flow is equal to 10,500 second feet the corresponding elevation would be 18.06, with no flashboards on the main crest, or 19.12 with flashboards on the crest. Proceeding to the other columns we have assumed that the average station use for this plant would be on the average 4,800 as shown by the average calculations from the last two years' operation of the power plant. And taking 4,800 second feet from the discharge shown in the second column we have the discharge shown in the fifth column; in the last columns are shown the same set of figures, except there is based upon [fol. 217] the full station use of 7,750 rather than the actual station use for the last year and nine months.

Q. Based upon this Exhibit 18 have you plotted curves which appear upon Exhibit 19—which I now offer in evidence?

A. I have.

Paper received and marked Defendant's Exhibit No. 19.

Q. Referring to Exhibit 19, what does the black line show?

A. That is plotted from Exhibit 18 previously described, and is the pond elevation without flashboards and before the construction of the Ford plant.

Q. And the red line?

A. That is pond elevation with flashboards with the average discharge through the power plant of 4810 cfs.

Q. What conditions have you studied on particular days to substantiate these curves?

A. The engineers for the plaintiffs and defendant, picked out from a study of the station log sheets, certain typical days on which the flow conditions were thought to have been the most suitable.

Q. Are those days, the days which appear in the stipulation, Plaintiffs' Exhibit 1, just at the head of paragraph 8?

A. They do. These particular days have been studied to determine the elevation under the various conditions of the pool at the Troy dam and have been checked against this curve and show substantial agreement. As I said before this curve represents average conditions and individual days may be expected to develop either one side or the other to the curve, but on the whole they do average up very well with the information on the specific days studied.

Q. These pond level duration curves, so-called, as shown in Exhibit 19, indicate what with respect to the loss of head sustained by the plaintiffs with flashboards?

A. Indicate that for about 61 per cent of an average year there may be expected to be an increase in pond elevation [fol. 218] averaging about .34 of a foot, and that the maxi-

Q. The minimum?

A. The minimum is zero, where the two lines cross.

Q. This is all with an average use of water through the defendant's plant of——

A. 4810 cubic feet per second. There are certain qualifications in my statement—there are certain qualifications which I would like to make in them—the calculation for this curve, for instance, as: we supposed that the flashboards would be in place at all times whenever the flow was less than the point of failure of those boards. It requires a certain time for the water to recede from the point of failure to the point where the flashboards become effective again upon the dam. And correspondingly there are certain days in the winter period when it is impossible to place flashboards upon the dam at all, when they would not be in place, and yet the flow would be less than that required for failure. Semi-curves here have been grafted, counting all the days when the flow was less than that point of failure; and this curve does include days when the flashboards were in actual use but would not be operated. It does not include when the flashboards might have partially failed and be leaning and still have certain cavities in them where certain of the boards were down, prior to their being replaced. If the pond were less than that the point required for failure, they are included. These figures represent possible outside influences which in actual practice are materially less than the figures shown by the curves.

Q. This loss of head, 61 per cent of the time, is shown graphically on this Exhibit 19 by the space enclosed within the red and black lines between point A and point B?

A. Yes; where the two curves cross the figures are ob-
[fol. 219] tained from within that area of the curve. I have neglected to include the benefit during the low water period at the right, or the high water period at the left, on the theory that possibly when increased heads were available in the pond, or lower levels were available, there might be no gain from them.

Q. This sheet, Exhibit 19, is divided at the bottom into spaces from 10 to 100 per cent of time of a year of 365 days?

A. Yes, sir.

Q. And between point A and point B which you have marked on Defendant's Exhibit 19, what is the total percentage?

A. It is about 69 per cent of the time. That is obtained by subtracting 16 per cent plus, that on the right, which is a little better than 22; making 39 per cent; 61 per cent being the balance.

Q. Thirty-nine per cent is obtained by adding together the percentage of point B to the left and from point A to the right?

A. That is correct. Thirty-nine per cent from A to the right and from B to the left; 61 per cent between A and B.

Paper marked Defendant's Exhibit 20.

Q. What is Exhibit 20?

A. Simply a representation of the information contained in the stipulation arranged in somewhat different form and giving comparisons with certain direct calculations; and the flow from upstream records and the corresponding height at the Federal lock and Waterford Lock No. 2.

Q. Was that exhibit used in the preparation of the curve Exhibit 19?

A. Not in its preparation, but for the purpose of check. These points can be plotted in this flow curve and check obtained in that way.

Paper marked Defendant's Exhibit No. 21.

Q. Was Exhibit 21, which I now offer, headed slope of pond, also used as a means of checking the accuracy of the
[fol. 220] curves shown in Exhibit 19?

A. Yes, sir. It has the same information as in the previous exhibit carried a little further as to elevations at the Troy dam and Waterford locks. This was obtained from the stipulation and was backed by the gauge height as furnished by the Federal Government or by the Barge canal apparatus.

Q. You don't say this backwater was obtained from the stipulation?

A. No, the basic information. We have had the claims for back-water.

Paper marked Defendant's Exhibit No. 22.

Q. Did you plot the curves on Defendant's Exhibit No. 22?

A. Yes, sir.

Q. State what those curves show?

A. This has been derived from the previous two exhibits and shows for any given discharge an elevation of corresponding points on guage 131, known as Lock No. 2 in the Mohawk and Lock No. 1 on the Hudson gauge 101. In other words, with 20,000 second feet flowing, the first horizontal line is the pond level at the Troy or at the Federal dam, if the pond were perfectly level from the Troy dam back to its upper end at Waterford. The second line shows by these percentage gauge readings what it was for that 20,000 second feet at Lock No. 2; and the third line shows the corresponding elevation at Lock No. 1 at Waterford on the Hudson river. In other words, to make the case clear, with 20,000 second feet flowing the increment head through the pond from Troy up to the upper end of the pond was about .16 of a foot, and a corresponding amount of increase in elevation at Lock No. 1 would be about .62 of a foot.

Q. Are those curves in relation to the existence or non-existence of flashboards?

A. No. These are based upon the starting elevations of the Troy dam and what the corresponding elevations would [fol. 221] be through that pond, and it makes no difference whether the flashboards are on or off of the dam.

Q. The next topic is the question of damage to the plaintiffs in the loss of head at their power plants on Kings canal, Waterford. I offer that in evidence.

Received and marked Defendant's Exhibit No. 23.

A. Exhibit 18 merely taking the curves with the backwater curve that this last exhibit applied to. In other words, for the various flows here, starting flows, we have shown on this last exhibit the various heads obtained as a result of this pond level duration coupled with the backwater curve of the last exhibit and the rating table.

Q. From that table just put in evidence, Exhibit 23, have you plotted the curves shown on Defendant's Exhibit 24, now offered in evidence?

A. Yes, sir.

Paper received and marked Defendant's Exhibit No. 24.

The Witness: This curve shows the same information. The information on those previous tables has been simply drafted as to any information for the Troy dam and the conditions at the power stations on the Kings canal. The upper curve shows, the faint line, the head at plaintiffs' plants, average discharge through the Ford station, no flashboards on the Troy dam, and that curve is marked A. The heavy line curve, solid curve, shows the head at plaintiffs' plants, all discharge over the Troy dam, no flashboards, and is marked as B. The dotted line is head at plaintiffs' plants, average discharge through the Ford station, flashboards on the Troy dam, and is marked C. This curve indicates, for instance, that the average head throughout the year, an average year, under the conditions of no flashboards on the Troy dam, the curve A would be 12.37; with all the discharge over the Troy dam, no flash-[fol. 222] boards, curve B the average would be 11.38. The head at plaintiffs' plants, average discharge through the Ford station, flashboards on the Troy dam, marked C, the average head would be 11.34.

Q. That shows the loss is what, of the average head?

A. It shows that the loss of head of an average discharge through the Ford station with flashboards, curve C, and an average for curve B, would be .04 of a foot, taking the average throughout the year. That includes everything, taking the whole year.

Q. While we were discussing the topic relative to the pond level duration curve, you spoke of an average loss of head to the plaintiffs of .34. Please reconcile those differences?

A. This curve here is simply taking it for the entire year and includes the times when there would be a benefit of head as well as a loss of head. In other words, the low-water portion of the curve and the high-water portion of the curve were included in determining this calculation on this last exhibit. On the previous one where I said the loss was .34 I simply took 61 per cent of the year when the loss occurred and gave no credit whatever for the other times of the year when there would be an offsetting balancing gain in the head.

Q. From Exhibit 23 did you also plot the curves on Exhibit 25—which I offer in evidence?

A. I did.

Paper received and marked Defendant's Exhibit No. 25.

Q. State what those curves graphically illustrate?

A. This was one of the curves simply to obtain the head shown on the previous exhibit, as a step in the process. The average head water elevation at Kings canal has been taken by agreement at 29.6, and the lower curves are the elevation curves and the tail-water elevations derived [fol. 223] through the elevation curves for the Troy dam corrected by the change in the slope of the various discharges worked through the duration flow curves, and these being the resultant curves of the elevation of the plaintiffs' tailrace. So the difference between the upper horizontal line and these curves represent the head available at the plaintiffs' plants under any condition of flow. The information on this exhibit was carried out in the previous exhibit in determining the duration head.

Q. The next topic relates to qualifying conditions tending to reduce damages claimed to have been sustained by the plaintiffs with reference to any loss of head which the plaintiffs might otherwise have sustained by reason of flashboards on the dam. Are there certain factors tending to mitigate that loss of head?

A. There are.

Q. State what they are?

A. I have already mentioned one of the principal factors —the question of the assumption that flashboards were always on the dam whenever the flow was equal to or less than the point of failure, which is about two feet over the top of the flashboards. That is one of the principal factors,

which would tend to decrease the actual loss. The second factor, meaning testimony that was developed here yesterday, it would appear that the information which we had obtained to the effect that the plaintiffs' plants operated twenty-four hours in the day might have some effect. I am not prepared to say just now what the effect would be. Of course this last year, 1925, has already been shown to be above the average year as far as run off conditions are concerned. In all of our calculations we have assumed that the backwater conditions where shown on that Exhibit 22, represent average conditions; but as the pond level comes up due to the increase resulting from flashboards, of course with the increased area and decreased flows there might be [fol. 224] some tendency to flatten out so that the slopes would not be quite as great as shown on that curve. Then there is the question of the possible effect of the discharge from the Delta and Hinckley reservoirs. In the testimony yesterday it was intimated that some of this flow from these reservoirs passed down in another direction than in the Mohawk river over to the west. But the amount of water which passes through this canal in that direction is very small. It is my opinion, as a result of my studies, that the discharge from the Delta and Hinckley reservoirs in the last two years, the water released from storage for regulating purposes, has been very much greater than in any previous three or four years, and that with this increased flow down the Mohawk it would seem that the discharge over the plaintiffs' dam would have been greater than in the years when such increase did not occur. If water does travel over the plaintiffs' dam it must necessarily increase the elevation of the plaintiffs' tailwater to some degree, so that, speaking of average conditions these plaintiffs should take into account some mitigating effect from the increased use of storage from the Delta and Hinckley reservoirs in the last two years. It is beyond my ability to state just how a curve can be made of that, but undoubtedly there is some effect there.

Q. With reference to the effect of water released from the Delta and Hinckley reservoirs, I offer in evidence Exhibit No. 26 and ask what that graphically illustrates.

Paper received and marked Defendant's Exhibit No. 26.

A. That is merely a graphical representation obtained from data in the State Engineer's report received from them prior to publication, of information showing the [fol. 225] amount of water released from the Delta and Hinckley reservoirs and the combined amount—the lower being the Delta, the next the Hinckley, and the top the Delta and Hinckley combined. This curve clearly indicates that the combined discharge from those two reservoirs in 1924 and 1925 was materially greater in volume than in the previous years. I compiled this information for the purpose of making up my mind whether there might be some possible increase in the tail-water at the plaintiffs' plants as a result of that release of stored water into the Mohawk.

Q. Are you able to state what effect these flashboards on the main crest have for navigation?

A. I feel that they are beneficial to navigation.

Q. What is the reason for your answer?

A. Primarily because the drift current adjacent to the walls of the lock is prevented during low water periods. When the flow gets up to a point where the water goes over the auxiliary spillway, the current conditions at that time are more uniformly distributed over the river. At extreme low times is the time when the effect is most pronounced; and from my own observation I know that there is a considerable current without flashboards adjacent to the lock.

Q. Was this picture bearing the legend in the lower right-hand corner 8-12-20 taken by you?

A. It was.

Q. On August 12th, 1920?

A. Yes, sir.

Mr. Whalen: I offer it in evidence.

Received and marked Defendant's Exhibit No. 27.

Q. Under what conditions was that picture taken and wha does it show?

A. I happened to be making some investigation at the lock one day and a barge with two tows was coming down the river and entering the lock. The current was sufficiently swift at the entrance from upstream—this boat was [fol. 226] traveling from the north to the south—to have caused considerable trouble due to the fact that as the tow

itself slowed down preparatory to tying up to the lock wall, perliminary to the filling of the lock itself, the two tying barges swung around over the nose of the pier. You will note where the men were standing. There is a barge on the far side of the lock wall and the second one just over the nose of the pier and the towing barge itself, because of the pull of the current, tending to carry the rear barges down the river, was caused to swing its bow in shore above the lock and it required considerable maneuvering to get the barge and its tows back in line so that it could enter and proceed down the lock. I simply snapped this picture as a matter of interest at that time.

Q. Does the presence of flashboards tend, in your opinion, to correct or improve navigation conditions as shown by this exhibit?

A. In my opinion, very materially so.

Q. Referring to Plaintiffs' Exhibit 15, what does that show with reference to the head of plaintiffs' plants during certain of the periods when there were no flashboards, as compared with periods where there were flashboards?

A. Assuming the canal elevation as 29.6 then these readings subtracted from that should indicate the gross head upon the plaintiffs' plants. Take the month of May, for example: 17.92 subtracted from 29.6 is 11.68 feet as the head. In June the result is 12.12; in July 11.08; in August 11.83. The average for the year is about 11.38 feet. September about 11.65 feet. Therefore there seems to be very little difference between months when the flashboards were supposed to be on, and other months, and many of them, when the flashboards were not on.

[fol. 227] Q. You find months when the flashboards were not on where the plaintiffs did not have as much of a head as in the months when flashboards were on?

A. Yes, sir.

Q. For example?

A. The month of May 11.68 compares—I must say there, that in September the flashboards were partly on and partly off, as I recall it, but they compare as 11.68 and 11.65. Just what difference the flashboards would make I would have to figure out day by day. But there is some slight difference between the various months.

Q. Irrespective of the presence or absence of flashboards?

A. Yes.

Q. For example again, does this exhibit show that in the month of May the plaintiffs had less head than they had in June?

A. Very close to .5 of a foot less head.

Q. And how does May compare with August?

A. About .15 of a foot less head in May than in August.

Q. Of course in May there were no flashboards on?

A. In May there was no flashboards.

Q. In July and August what proportion of flashboards were in place, can you state? A. Not from personal knowledge; but my understanding is from 25 per cent, one-third to a quarter, is stated to have failed and the balance remained but somewhat tipped.

Q. I show you Plaintiffs' Exhibit No. 9. Do you see on Plaintiffs' Exhibit No. 9 where the wheels in the waters of Kings canal are indicated as being?

A. Yes, sir.

Q. At what line with reference —?

A. Between 16 and 17 elevation.

Q. Does that show whether or not those wheels were submerged?

A. On this exhibit—no, sir.

[fol. 228] Q. With reference to 16, will that indicate it?

A. I think these are just lines drawn for arbitrary height here. It shows they would be submerged when the water got up to 17.2.

The Court: Height of crest and flashboards, elevation 17.2. That would be there was no submergence?

A. No; submergence occurs at 17.2 at plaintiffs' plants. With reference to one of my own drawings, this time or duration of head water and tail water elevations—tying it into an average year, and by reference to that curve, it would show between 16 and 17, or to an elevation of 17, that is the curve shown in the heavy upper line, that they would be submerged under those conditions pretty near 80 per cent of the time; but at very low times, off to the right, where those lines got below 17, they would not be submerged in an average year.

Q. That is without flashboards?

A. The various curves shown either with or without flashboards. With the average discharge through the Ford plant and no flashboards on the Troy dam—in that case

the lower line—they would be submerged for between 40 and 50 per cent of the time. At elevations from 17 to 16, it runs out way over here to 65 per cent. So there would be a material percentage of the time when those wheels would be submerged—approximately 50 per cent of the time.

Q. And if the water wheels were already submerged 50 per cent of the time, what effect on their efficiency would there be from the slight increase in the depth of the water?

A. That question of power output is taken care of by the efficiency of the wheel itself and the setting in which it is placed. The discharge being into a draft tube, really makes no difference especially in wheels that are in open [fol. 229] flume setting. I can see that there would be very little difference in efficiency there.

Q. Referring to Plaintiffs' Exhibit 10—does that show the height of plaintiffs' tail water on October 24th and 26th as compared with the height on October 1st?

A. Yes, sir.

Q. And October 24th and 26th it is shown that the height of plaintiffs' tail water was higher than on October 1st?

A. 18.42 against 16.76, yes.

Q. The answer is yes?

A. Yes, sir.

Q. Can you account for that difference in the tail-water height?

A. I should say largely due to the increased flow in the river—natural increased flow in the river.

Q. What is the flow on October 1st?

A. According to Plaintiffs' Exhibit 11 the flow is 8,100 second feet.

Q. On October 24th and 26th, showing you Plaintiffs' Exhibit 12?

A. Discharge October 24th, 12,200; October 26th, 51,500.

Q. Checking against Plaintiffs' Exhibits 11 and 12, the discharge was greater, is that right?

A. Yes, sir.

Q. What is the capacity of the notch?

A. 5,000 cubic feet a second.

Q. If you had 5,000 cubic second feet passing through that notch and you closed that notch and divert the same volume of water through the power plant what is the result?

A. It all depends on your starting elevation of your pond. If you suddenly divert the 5,000 through the power plant and use it, the elevation will be the same—5,000 coming down the river, you are assuming?

Q. Yes?

A. Yes, sir.

Q. When you close that notch and divert the 5,000 second feet from the notch through the power plant what is the result upon the level of the pond?

A. It remains the same.

Recess until two o'clock.

[fol. 230] Afternoon Session

Cross-examination by Mr. O'Connor:

Q. Will you refer, Mr. Wood, to Defendant's Exhibit No. 26, which is marked "water released from Delta and Hinckley reservoirs," and tell me where you got the cubic feet released from storage for 1925 from the Delta reservoir?

A. We sent to the Barge canal a request for it—or rather the New York State Engineer's office, for information on it. We received a copy of the capacity curves for both of these reservoirs. We have computed all of the drawn-down period of the reservoir and the corresponding amount of cubic feet during those drawn-down periods, and computed them for the entire year.

Q. Now, give me the information you received from the State Engineer's office for 1925 for the Delta reservoir?

A. There is the sheet of water surface elevations of the Delta reservoir for the year 1925.

Mr. O'Connor: I would like to have it marked for identification.

Paper Marked Plaintiffs' Exhibit No. 20 for Identification.

Q. Is this the particular sheet you received from the State Engineer's office?

A. It is.

Q. And did you receive any communication from the State Engineer's office at that time?

A. I say it is—according to my recollection it is. I think these are the original sheets.

Q. Did you receive any communication from the State engineer's office?

A. Yes, sir. We received a reply.

Q. Have you that letter here?

A. No, I have not. That is in our original files.

[fol. 231] Q. Don't you know that the Delta reservoir was out of commission for a great part of the year 1925 and that the gates were wide open?

A. The levels are shown in there—what do you mean by out of commission?

Q. The gates were open and the dam was not used as a reservoir during that period?

A. As a storage proposition?

Q. Yes.

A. I don't know that. In fact, it doesn't really concern me in the calculation I was making.

Q. Whether or not the Delta reservoir was in use or not does not affect you in any degree?

A. Here is a storage basin with a reservoir rising and falling. There is so much released whether it is artificially or naturally controlled.

Q. The same amount in any case?

A. Yes, and that amount of water would come from them.

Q. What difference does it make—the water would come down the Mohawk river anyway?

A. More did come down in that year.

Q. Do you know where that water formerly came from that is stored there?

A. In a general way.

Q. Where?

A. It comes partly——

Q. I mean before those dams were constructed where did the water from those water sheds go?

A. I think it is the Black river that has been diverted, if I recall; running into the reservoirs there are two or three diversions.

Q. Did you investigate that to find out?

A. Not seriously.

Q. Don't you know it is a fact that the Delta and Hinckley reservoirs are both on the Mohawk river water shed?

A. Yes.

Q. And the water whether impounded by those dams or not would come down that river just the same?

A. Yes.

[fol. 232] Q. So there is no increase in the flow in any year?

A. As compared with previous years, yes. We have taken the amount of change in water surface elevations. It makes no difference whether that is artificially controlled by gates, or whether a Federal lock. The change in the water surface elevations indicates how much comes out of those storage locks.

Q. Whether that dam is there or not, that same water would come down the Mohawk river?

A. Yes, but distributed differently.

Q. It would be distributed differently?

A. In the year, yes.

Q. How is that water let out from those reservoirs? What is the purpose of letting it out?

A. The original purpose was primarily for water for the operation of the Barge canal; and second, for increasing the low water flows of the river for increasing the power of various plants below.

Q. Show me where the State constructed the Barge canal dam for the purpose of increasing the power anywhere?

A. They developed these dams for these reservoirs.

Q. So that all the water was for the purpose of running the power plants?

A. I am speaking from having read the Government and State reports.

Q. Did you investigate anything about how that water is released from those reservoirs?

A. Only from what I read in the State report.

Q. Isn't it a fact that the water is let out in accordance with the number of lockages on the Barge canal?

A. I think not.

Q. Have you any information or knowledge?

A. May I explain that answer? I think that they have found that the requirements for the Barge canal are much

[fol. 233] less than they anticipated and that there is surplus waters available for power.

Q. Did you make any investigation to find out whether or not there has been any water diverted from the Mohawk water shed?

A. There is water diverted over the Summit level and locks to the west; a very moderate amount.

Q. The water from from the Delta and Hinckley reservoirs goes into the Summit level at Rome?

A. Only from one of them.

Q. You are sure of that?

A. I think so.

Q. Which one?

A. The Hinckley, I think; the Delta coming down from West Canada lake, if I recollect correctly. The Delta reservoir is four miles above the city of Rome. That is the one, the Delta reservoir which discharges into the Summit level. The Hinckley reservoir which is our West Canada creek at Hinckley comes down through West Canada creek into the Mohawk.

Q. Are you sure of that?

A. Some of it I suppose, goes into the Barge canal.

Q. Does the water from Hinckley come down Nine-Mile creek?

A. I think it does.

Q. Isn't it a fact that that is the way it runs—from the Hinckley reservoir into the Barge canal?

A. I am not sure.

Q. So when you were testifying of that water going down below the Summit level, you did not know?

A. I think most of the water from the two reservoirs goes down the Mohawk.

Q. Isn't it a fact, or do you know whether the water from both of those reservoirs goes into the Summit level, and wasn't it the purpose of those reservoirs to feed that Summit level?

A. That I am not sure of.

[fol. 234] Q. In your testimony here today you were merely guessing at that?

A. No, I have notes from the Barge canal report.

Q. Where did you get them?

A. From the State report. I have their map and I think that you have.

Q. What does it show?

A. It shows the canal scheme, the tributary features, and so forth.

Q. And what does it show with reference to the discharge waters from the Hinckley reservoir?

A. I don't recollect exactly.

Q. And you made no note of it in your testimony here?

A. No; only to the effect that it was my belief that the major part of the water from those two reservoirs does come down into the Mohawk river.

Q. I am talking about the Summit level. Did you know whether or not both of those reservoirs discharged into the Summit level when you testified here today?

A. No, I did not know that definitely.

Q. When water is discharged into the Summit level from those reservoirs it goes both ways?

A. A very small amount necessary to supply the canal goes both ways.

Q. Do you know how much is necessary to supply the canal?

A. Roughly speaking.

Q. How much?

A. I should think at the outside probably, roughly, not over 50 cubic second feet. Some estimates, I believe, is something over 100 for the present use of the Barge canal; but I don't think it will exceed over 50 cubic feet.

Q. So there is at least 50 cubic second feet passing into the Summit level which must go west?

A. Either way. They have locks with sluices of the same elevation.

[fol. 235] Q. You know that the boats that come up the river go through the locks west to Buffalo?

A. Yes, and some go east.

Q. And so when they lift the boats up with this water they have to drop them down too?

A. Yes, sir.

Q. It takes fifty feet in either direction?

A. No, I don't think so.

Q. Are you guessing about how much water is or is not used in these canals?

A. No. In times past I have had occasion to study considerably Barge canal operations.

Q. You testified that those reservoirs increased the flow of the Mohawk river and yet you don't know how much the Mohawk river was decreased by the diversion of water westward towards Buffalo?

A. Not exactly; and I have not calculated how much it was increased by the reservoir.

Q. No calculations on that at all?

A. No. I am simply testifying that so much was released in the year.

Q. If it was released from the reservoir and went into the Summit level, some went west?

A. A very small amount.

Q. Was there any other diversion from this Mohawk water shed during this recent period?

A. I am not sure yet whether there has been any diversion in the Schoharie creek or not.

Q. Do you know what the Gilboa dam is?

A. Yes.

Q. And its purpose?

A. Yes. It is a dam on the upper head waters for the purpose of impounding water for the New York city water supply.

Q. Do you know what percentage of the Mohawk river is back of that dam, the Mohawk river water shed?

A. Very few square miles.

Q. Don't you know that there is 10 per cent of the Mohawk water shed?

A. I don't know. I figured the damages at one time.

[fol. 236] Q. Don't you remember that the Gilboa dam takes away approximately 10 per cent of the entire water shed of the Mohawk river?

A. I don't believe it does.

Q. How much do you think it takes away?

A. I should be surprised if it took away one per cent.

Q. Do you know what the water shed is?

A. 3,506 square miles. I would be surprised if it exceeded thirty-five square miles.

Q. You did not think it important enough to investigate before you testified in this case?

A. Not considering the small percentage, no, sir.

Q. I show you State Engineer's report for the year 1924, and call your attention to page 265 of that report, and

particularly to the area of the water shed at Gilboa, and ask you to tell the court what the area of the water shed back of Gilboa dam is?

A. 402 square miles.

Q. So considerably more than 10 per cent of the Mohawk river water shed is back of this Gilboa dam.

A. That is correct.

Q. So that considerably more than 10 or 12 per cent of the area of the water shed is cut off by this Gilboa dam, isn't it?

A. Not necessarily all of it is diverted.

Q. All of the water in minor flows of the river, and that water is taken through a tunnel to the Ashokan reservoir?

A. I believe so.

Q. And from there taken down to the city of New York so that it is completely out of the Mohawk river, and you have worked on claims for power companies on the Mohawk river to recover damages for this diversion?

A. I have.

Q. Don't you think that is a great deal larger in quantity than any possible increase in the volume of water resulting from the Delta and Hinckley dams?

A. Not necessarily.

Q. Do you know what the water shed is back of those reservoirs?

A. The Hinckley reservoir has a drainage area of 3.73 [fol. 237] square miles; the Delta reservoir I have no records of it at the moment.

Q. Did you take into consideration in stating that the flow of the Mohawk at the plants of the plaintiffs had been increased, did you take into consideration the fact that the water which is used for Barge canal purposes was taken out of the river above the Crescent dam and returned downstream below the plants of the plaintiffs?

A. I think, if I recall my testimony, I did not say necessarily that the flow had been increased. I said that it may have been greater as a result of these reservoirs. And in the second place, the amount of water that that canal would carry was very small.

Q. You would not want to say whether the flow of the Mohawk has increased or decreased?

A. I am only making the statement as a possible increased flow as a result of the operation of these reservoirs.

Q. There is a pretty good possibility that in the operation of the Gilboa dam the flow of the Mohawk river has been quite substantially decreased.

A. Quite a possibility.

Q. You understand from the stipulation here that the old State dam had an elevation of 12.2 at its crest?

A. Yes, sir.

Q. And that flashboards were maintained on that dam only during the summer months?

A. Yes, sir.

Q. Now, you also know that this new Federal dam has an elevation of 15.2 and that is there all the year?

A. Yes.

Q. And that the other section of the dam has a crest of 17.2?

A. Yes.

Q. So that the raise above the old State dam during half the year is on one side two feet and on the other side four feet?

A. The raise in the height of the dam without flashboards on the old State dam——

[fol. 238] Q. My question was during six months in the year?

A. Which six months?

Q. The winter months.

A. The winter months.

Q. You know from your studies of this situation that that increase in the height of the Federal dam backed wafer onto the tailraces of these plaintiffs?

A. I have not studied that from the point of view of the old State dam.

Q. Can't you say whether there is a raise from three to four feet in the dam at Troy?

A. I will not. My studies did not go back to the period of the old State dam at all.

Q. Forget the State dam. From your studies of the water conditions between the plaintiffs' plants and the Federal dam, can you tell us whether an increase in the height of a weir from 13.2 to a combination of 15.2 and 17.2 would

cause an increase in the elevation of the water at the plaintiffs' tailraces?

A. It certainly should.

Q. Of which reservoir did you give me the water shed?

A. Hinckley.

Q. Now, referring to the Plaintiffs' Exhibit No. 15. In answer to questions of counsel for the defendant, you said that it appeared that the plaintiffs' head was less in certain months before the flashboards were on, than it was in months after the flashboards were on, is that correct?

A. I think I drew certain comparisons that indicated that.

Q. Referring to Plaintiffs' Exhibit 15—I want to ask you what the plaintiffs' head was in January, 1925?

A. I should estimate from this sheet, not knowing how else to use it, that the headwater was 29.6 in accordance with the stipulation, and that the tail-water was 15.31 in January.

Q. Using a net head of how much.

A. 14.3.

[fol. 239] Q. At that time there were no flashboards on the dam at Troy?

A. That is correct. Of course, from the testimony that I heard here yesterday, not from my own knowledge.

Q. During the month of July, we understand from the testimony, that the flashboards were on the dam for the greater part of the month?

A. Yes.

Q. Now, what was the plaintiffs' head during the month of July?

A. 11.02.

Q. How does that compare with the head in January?

A. I assume that that is caused by more water in January than in July.

Q. How does that compare with the head in January?

A. It is lower.

Q. The plaintiffs had three feet less head in July when the flashboards were on, than they did in January when the flashboards were off, was that correct?

A. Yes, sir.

Q. You also testified in response to Mr. Whalen's question, that the plaintiffs had a head in March of only ten feet, or nine feet, didn't you?

A. I don't recall that I used the month of March. It would be 20.23 from 29. That would make a head of 9.4 in March.

Q. Can you tell us from your studies of the river discharge records in that month why the head was so small?

A. Average flow for January was 4,370, average flow for March 34,500; these readings being at Troy.

Q. The result of flood conditions?

A. Yes; that is what I should have said.

Q. Were comparisons made between May and July?

A. May and July, yes. 11.68 against 11.02 of head.

Q. Wasn't the water higher in July than it was in May, the tail water?

A. The water was 11,000 second feet in July and in May 14,900, a slightly greater discharge in May than in July.

[fol. 240] Q. Referring to this notch, I understood you to testify in answer to Mr. Whalen's questions that that notch would discharge 5,000 second feet?

A. According to the rating table attached to the stipulation.

Q. Is that the rule under all conditions?

A. No, sir. If free from flashboards and all other obstructions it would be true.

Q. It won't discharge any more than 5,000 second feet?

A. With the notch just full.

Q. Suppose you have instead of two feet of water flowing over the dam, suppose you have three feet; then how much is going through that two-foot slot?

A. It will be pretty hard for me to say.

Q. Is it more than 5,000?

A. Yes. We take account of that in the so-called unit discharge based upon the amount of flowing water over the particular crest.

Q. So that this little slot that is occupied by flashboards will at times discharge more than 5,000 second feet of water?

A. If the pond level is more than the 17.2.

Q. If the pond level is a tenth of a foot higher than 17.2 that slot is discharging more than 5,000 second feet?

A. Yes, because it is a tenth of a foot higher at the gauge point at that pond.

Q. I mean through this two-foot slot, not figuring the water above it, but the water through the slot is more than 5,000 at the bottom when the pond level is more than 17.2?

A. I don't know how—how much is going through the top layer or the bottom layer. I have never made any experiments to study that particular thing.

Q. Was more water being discharged than 5,000 through that slot at any time that the pool level was more than 17.2?

A. I should think there would be.

[fol. 241] Q. I call your attention to the rating table that you have put in evidence, showing the total discharge over the crest of this dam with flashboards on at an elevation of the pool 18.2 and ask you what is the total discharge over the dam at that time?

A. Three thousand seven hundred and seventy cubic feet.

Q. That is the elevation of 18.2 and the flashboards on?

A. Yes, sir.

Q. So that you have a crest of 17.2 entirely across the river, is that correct?

A. Yes.

Q. And the depth of the water is one foot over that crest?

A. One foot.

Q. That discharges 3,770 cubic feet per second?

A. That is correct.

Q. If you take the flashboards off and still have the pool elevation 18.2 how much water is discharged over the dam?

A. Eleven thousand six hundred.

Q. Eleven thousand six hundred feet is discharged over this dam without flashboards at an elevation of 18.2 as against 3,770 second feet over the dam with the flashboards on and the same pool elevation, is that correct?

A. That is correct.

Q. Doesn't that show that through that slot of two feet there is considerably more than 5,000 second feet passing?

A. I don't know how you can figure it from that.

Q. Doesn't it show that there is 3,770 second cubic feet passing through that notch under those conditions?

A. There is 1,830 second feet passing over the auxiliary spillway; the balance is going over the main spillway. That is shown from the rating table, our Exhibit 16.

Q. With the same pool elevation of 18.2 that dam will discharge 7,830 second feet more than it will discharge with the flashboards on there and the same pool elevation?

[fol. 242] A. Seven thousand eight hundred and thirty feet, yes.

Q. So that the presence of those flashboards prevent the passage under that pool elevation of 7,830 cubic second feet?

A. Providing there is no passage through the power plant.

Q. The presence of those flashboards prevents the passage of 7,830 second feet?

A. Yes—all of which is not going through the notch itself. You are one foot above the area of the notch. The notch we are talking about is only two feet deep. While the discharge above that main crest is 7,830, I cannot tell you how much is going through the exact two feet, but the whole 7,830 corresponds to a three-foot depth over that spillway.

Q. How much water will that dam discharge with a pool elevation of 18.2 with the flashboards on?

A. Three thousand seven hundred and seventy.

Q. How much water will that dam discharge at a pool elevation of 18.2 with the flashboards off?

A. Eleven thousand six hundred.

Q. And that is a difference of 7,830?

A. That is correct.

Q. And the only condition we have changed is the presence or absence of flashboards?

A. That is correct.

Q. Now take the pool elevation of 19.2. How much water would be discharged over that dam with a pool elevation of 19.2 without flashboards?

A. Twenty-one thousand five hundred.

Q. How much water will be discharged over that dam with a pool elevation of 19.2 with the flashboards on?

A. Eleven thousand two hundred.

Q. And the difference?

A. Ten thousand three hundred.

[fol. 243] Q. And that loss is caused entirely by the presence of the flashboards?

A. That is correct.

Q. One step more—an elevation of 20?

A. Flashboards will be out beyond this last point you have spoken of.

Q. So that each of those instances the presence or absence of flashboards prevents the discharge of a much greater quantity of water than 5,000 second feet?

A. Yes.

Q. And isn't that the result of an increased velocity of the water through the slit resulting from the pressure?

A. There will be a greater percentage of discharge over the top spillway, than the short one.

Q. Explain just what that is from your experience?

A. Of course, the discharge over a given spillway increases as the depth of the water on that spillway increases.

Q. That is when the velocity of the water increases, is that correct?

A. Yes, the velocity increases.

Q. So that this two-foot slit will discharge a greater quantity of water under a full head than it will under a two-foot head?

A. Certainly.

Q. And if you take the flow of the river, 21,000 second feet, and put these flashboards on, which prevent 10,000 cubic feet per second from passing, you do not equalize that by drawing 4,800 second feet through your power plant?

A. No.

Q. Not even in January?

A. No.

Q. And the same is true at an elevation of 18.2 when you have a flow of 11,000 second feet in the river?

A. That is correct. You recall I have already indicated that there would be under these conditions you speak of an increase of pond level.

Q. Now, have you got conveniently here the raise in the pool elevation which was the result under these conditions: [fol. 244] a flow in the river of 21,000 second feet, the plant drawing 4,800, the flashboards were on—how much higher is the pool under all those conditions than it would be if the flashboards were off and there were no plant—in each case the flow of the river is 21,000 second feet?

A. Yes.

Q. In one case the flashboards were on?

A. Yes.

Q. And the plant is drawing 4,800 second feet?

A. Yes.

Q. And in the other case?

A. The answer to the first one is .55 of a foot with the flashboards on and 4,800 feet through the plant. Now the answer to the second case, about 1.1 feet, if I scale it correctly here from this curve.

Q. The pool would be 1.1 feet higher with the flashboards and the plant?

A. It may be plus or minus a tenth or two.

Q. Than without the flashboards and without the plant?

A. And with no discharge through the power station.

The Court: What is meant by the head?

A. The head is the difference in elevation between the head water and the tail water at a power plant.

Q. What is tail water?

A. That is the water surface just on the side of the turbine as it leaves the head water at the station.

Q. Are tail water and tail race synonymous?

A. Yes, sir. There is a minor modification. Tail race may apply to a long excavated channel down the river; tail water is usually applied to the elevation right at the power plant.

Q. At the place of discharge?

A. Yes, sir. But in the event that there is no long tail race down the river, they are synonymous.

[fol. 245] Q. When these flashboards were maintained did they cross the entire dam?

A. Only the main crest.

Q. The diagonal crest has had no flashboards?

A. No.

Q. It is the crest on the easterly side?

A. Just filling in the notch as we call it.

Q. What is the extent of these flashboards—the length?

A. Five hundred and eighty-six feet.

Mr. O'Connor: The flashboards occupied a space two feet high and 586 feet long?

A. Yes, sir.

Q. And the crest of those flashboards was level with the westerly or diagonal crest of the dam?

A. Yes.

Q. Which is of concrete two feet higher than the easterly side?

A. Yes, sir.

The Court: The purpose was to make the easterly side the same height as the westerly?

A. Yes, sir.

Mr. O'Connor: In speaking of head in discussing the head over this dam we were discussing the difference between the top of the water and the crest of the dam?

A. Head on a dam is always spoken of as the depth over the crest of the dam, usually scientifically measured back a few feet from the actual overflow; but primarily the depth of pool above the normal crest of the structure.

Q. Now, Mr. Wood, you have had experience in connection with the operation of power plants, or supervision of them?

A. Not directly.

Q. You know the purpose of flashboards in connection with the operation of power plants?

A. Yes.

Q. Will you tell the court how they are utilized in connection with power plants?

A. Flashboards are installed upon a dam in order to [fol. 246] create a certain section of pond which will be available for use, what we call pondage. A power plant in operating through a 24-hour period will never operate at a constant load day in and day out. For instance, there may be, in the first place, Saturday or Sunday, or a little shut-down; in the second place, at all the hours of the day there is rarely continuation of load. The water wheel is covered by certain gates which spasmodically open or close based upon the power demand upon that same unit, operated by centrifugal force. These gates will open or shut according to the demand for power. Consequently the water wheels would take a greater or a less amount of water depending upon this load requirement. That, of course, in turn creates a greater or less amount of draft upon the pondage. So that in using the pond you get what is called a week-end equalization of the load. If your operations were continuous with a heavy load you would overtake, after a certain time the natural amount of water coming

into that pond and thereby lower the pond itself, by taking out the excess water or pondage. At another time the load may be decreased to such an extent that the demand on the water supply is lower than what is naturally flowing down the river and in that case the pond will recover its equilibrium. The amount of that demand on the pond, depends largely, of course, upon the load conditions at your plant. For example, in this particular case the plant is operating at practically an 85 per cent load factor, which means that it is running pretty nearly a steady load through the day, but there is that 15 per cent fluctuation. Load factor is the ratio of the average load to the maximum load in 24 hours. And the same thing would be true of the water demand. So when we speak of 80 per cent load factor, we are referring in a sense, to the demand upon that pond. [fol. 247] If you have a two-foot storage space in the pond this average utilization of it will result in the average head being somewhat less than the full amount of head derived from the installation of an obstruction, whether a dam or flashboards, or what not.

Q. Suppose the plant requires at a certain period of the day 3,000 cubic feet a second to carry the load and at that time there is 4,000 second feet running in the river. What happens to that other 1,000 second feet?

A. That other 1,000 is doing one of two things. If the pond is full it is going to waste over the dam; if the pond has been drawn down by previous operations it is replacing the pondage.

Q. It is piling up in behind these flashboards?

A. And building it up until it gets to the crest and then it will spill over.

Q. And if the flashboards were not there that 1,000 feet would go on down the river?

A. That is true.

Q. In the case of defendant's plant, if the Hudson river at that time is running at the rate of 5,000 and your plant is only demanding for a period of six hours a power which requires 3,000 second feet, that other 2,000 is being built up back of the flashboards until it spills over?

A. That is correct if the facts are true.

Q. If the assumption is correct that is correct?

A. Yes, sir.

Q. So during that period of six hours you are backing water to that extent on these plaintiffs' plants?

A. Yes.

Q. And you are backing it up two feet?

A. Yes.

Q. Because if the flashboards were not there the elevation would be 15.2?

A. There would be momentary times in the day when the pond would be two feet higher. As I said before, my calculations are based upon an average condition through the twenty-four hours.

[fol. 248] Q. Aren't there periods in the day when these flashboards actually back two feet of water on the plaintiffs' plants?

A. Yes, it increases the height two feet there.

Q. Isn't it a fact that at certain times in the day these flashboards back two feet of water on the plaintiffs' plants over what the elevation would be if they were not there?

A. Not the way the plant is operating. Under your assumption that is true.

Q. Aren't there instances when that has occurred?

A. I rather doubt it on account of the demand the plant has on the river.

Q. Has the demand ever dropped low enough so that condition would exist?

A. It might possibly be, on a Sunday or shutdown.

Q. It has every Sunday?

A. No; it is pretty well maintained on Sundays. It is not always true. Take it in the winter time, for example.

Q. We picked out certain days for the purposes of those gates?

A. Yes.

Q. And I call your attention to July 4th which appears in that stipulation.

A. July 4th, 1925. Yes, there is a day when the load was low.

Q. You were only drawing 880 second feet out of a total flow of 8,590?

A. Yes.

Q. On that day the defendant's flashboards were backing practically two feet of water on plaintiffs' plants?

A. Yes, practically.

Q. The whole day?

A. No. The river is taking a certain time to equalize the flow. You have a heavy draft on the previous day and you have to build up your storage. It takes a certain time to create your hydraulic conditions.

Q. And it took you a certain time to draw it down?

A. Yes. But that would not be of equal duration.

[fol. 249] Q. As a matter of fact that backing did go over in the 5th of July?

A. Probably it did.

Q. And in the first part of that day, the 5th of July, the backing was pretty close to two feet then, wasn't it?

A. The gauge varied a tenth from the 3rd to the 4th and dropped from the 4th to the 5th.

Q. What is the gauge height on July 4th?

A. Nineteen feet at Troy.

Q. And if it had not been for these flashboards it would have been seventeen feet, or practically seventeen feet?

A. Possibly.

Q. That meant that on that day there was at least two feet backing on plaintiffs' tailraces caused by these flashboards, or within a small fraction?

A. Approximately that, yes.

Q. Take June 21st, from that stipulation, where it appears that the flow through your power station was 2,500 and the flow in the river was 4,000 second feet?

A. Yes, sir.

Q. Now, on that day there was 2,000 second feet being backed up by these flashboards on to the plaintiffs' plants?

A. Approximately that.

Q. And that was pretty close to a foot of backing on that day even leaving off the draft through your plant?

A. Yes.

Q. It was more than a foot wasn't it?

A. Assuming the pond was full.

Q. What was the elevation of the pool?

A. 17.9, and the discharge over the dam at that particular time was 2,150.

Q. The backing at that time was over a foot on the plaintiffs' plants?

A. What do you mean by the backing on plaintiffs' plants?

Q. It was two feet, wasn't it?

A. Do you mean the increased height before this plant of Henry Ford's was constructed, against those conditions, or [fol. 250] against conditions after his plant was constructed, but before flashboards?

Q. If the plant was there and there were no flashboards the river would have been two feet lower wouldn't it?

A. Approximately.

Q. With the plant there and no flashboards how much lower would it have been?

A. It would have been down to about 15.2, the crest of the other dam, because the power plant was using more than the river was flowing. Pardon me a minute—the power plant was 2,120, over the dam 2,150 or a total of 4,320.

Q. What was the actual elevation of the water on that day with the power plant running and flashboards?

A. The average, 17.9.

Q. What would the height of the pool have been if there had been no flashboards there and your plant had not been running?

A. About 17.05.

Q. So that the pool was .9 of a foot higher with flashboards and plant than it would have been without flashboards and without plant?

A. Approximately.

Q. What would the elevation of the pool have been if there had been no plant there and no flashboards?

A. Approximately 16.4.

Q. That is, about a foot and a half lower than it was?

A. Yes.

Q. So that under any assumption the pool was higher with these flashboards on than it would have been without them?

A. Provided it is all within the years of the Ford plant.

Q. I am talking about the actual conditions that existed on June 21st, 1925, as they have been stipulated.

A. You must recall that the Ford plant in creating these conditions, is simply going back to the conditions prior to the construction of any plant there.

[fol. 251] Q. Going back to the conditions prior to the construction of any plant?

A. My figures are based upon the comparison of conditions with flashboards and the plant operating as against the conditions which applied prior to the construction of the plant at all.

Q. That is, you compared the conditions with flashboards and plant, with the conditions without flashboards and without plant?

A. That is it.

Q. And on June 21st this pool was .9 of a foot higher with the flashboards and with the plant than it would have been without any flashboards and without any plant, isn't that correct?

A. Yes, sir.

Q. So that under any conditions that you want to assume that pool was .9 of a foot higher than it would have been without those flashboards?

A. Without the plant and without flashboards the pool level would have been about 17.05 as against the 17.9.

Q. Which it actually was ?

A. Yes, on that day.

Q. Now, that does show on that particular day a backing on plaintiffs' plants by the use of flashboards of .9 of a foot?

A. Yes.

Q. Take September 1st, which was another day which you selected, September 10th, 1925. On that day the river was flowing at the rate 3,970 second feet. What was the actual——

A. Of course you must recollect the river conditions were quite different this year than my average conditions which I described this morning.

Q. I am not talking about average conditions. I am talking about a particular day. Take the 10th of September and tell us what the condition was then.

A. You had through the power plant 3,720, over the dam 3,160, or a total flow of 6,880.

Q. What was the elevation of the pool on that day?

A. 18.1.

[fol. 252] Q. What would it have been if there were no flashboards on the dam, but your power plant was operating?

A. Been about 16.75.

Q. What was it actually?

A. 18.1.

Q. Now, what would the pool elevation have been if there were no plant and no flashboards?

A. About 17—roughly a little less than 17.6.

Q. So that at that time the pool was 1.3 feet higher than it would have been if the flashboards were not on, but your plant was operating?

A. For that particular day, yes.

Q. And it was half a foot higher?

A. I am assuming you are quoting the condition correct.

Q. It is a half foot higher than it would have been if you had not had any plant there and you did not have any flashboards?

A. .5 is correct.

Q. So that on that day these flashboards were backing a half a foot of water at least on the plants of the plaintiffs?

A. Yes.

Q. Over the condition which would have existed if there were no plant and no flashboards?

A. Yes.

Q. And what about the conditions on July 1st, 1925, another one of these selected days in the stipulation?

A. July 1st, 1925, there were 6,240 through the plant, 13,550 over the dam, 19,780 total.

Q. Now, what was the actual elevation of the pool on that day?

A. 19.4.

Q. Is that your readings at the plant or is that the Federal employees' reading?

A. That is an average height for the day. It is not a special reading.

Q. I mean, where did you get it?

A. From the Federal dam records.

Q. I show you Plaintiffs' Exhibit 14, being the water elevations of the Troy dam and recorded by the United States Government, and ask you what the water elevation is there on July 1st?

A. 19.4.

[fol. 253] Q. What would have been the elevation of the pool if there had been no flashboards but your plant was in operation?

A. Approximately 18.4, or a little better.

Q. That is about 1.1 feet lower?

A. One foot lower.

Q. What would have been the elevation of the pool if there had been no plant and no flashboards?

A. A little more than 19.0.

Q. So that on that day the flashboards were backing .4 of a foot of water on plaintiffs' plants as compared with the condition which would have existed without any plant or flashboards?

A. Yes, sir.

Q. And backing one foot of water as compared with the conditions which would have existed with your plant in operation and no flashboards?

A. Yes, sir.

Q. Take July 14th, 1925, and give us the same data for that day?

A. The flow through the power station 3,670, over the dam 2,860, total 6,530 second feet.

Q. Now, give us what the pool elevation actually was and what it would have been without plant and without flashboards?

A. July 14th, 18.0 gauge height. That would have been 16.65 without the flashboards and with the plant running, or 1.35 feet difference in head. With the entire flow over the dam, without the plant and without flashboards, would have been about 17.5, or .5 of a foot. You will understand I am not taking the time to interpolate for minor conditions of a few hundredths; taking within the nearest tenth.

Q. One other day, August 27th; put on the record the same information about that day.

A. The flow through the station was 4,320, over the dam 1,860, total flow 6,180. August 27th, the average gauge height was 17.8; 1,860 over the dam without flashboards and the power plant operating, about 16.03 or 1.5 feet difference. Entire discharge 6,180, without flashboards, no plant, would have been about 17.45, or a difference of .35 of a foot.

[fol. 254] Q. We have now gone over every one of the days in this stipulation during the period of the flashboards, have we not?

A. June 21st, July 1st, July 4th, July 14th, August 27th, and September 10th.

Q. And we have gone over all those dates, haven't we?

A. I don't know about July 4th, that was 2,590, total discharge; 880 going through the power plant and 7,710 over the dam; an average gauge height of 19.0. Discharge 8,710 over the dam with the plant operating, no flashboards, would have been approximately 17.85 or 1.35 feet difference. The entire discharge over the dam 9,590 would have been 17.95 approximately, or a difference of 1.05.

Q. That is, on this particular day, July 4th, the pool was 1.05 feet higher actually than it would have been without any plant and without any flashboards?

A. Yes, sir.

Q. We have covered all of the days in 1925 specified in this stipulation between the parties, which has been marked Plaintiffs' Exhibit No. 1, have we not?

A. Yes, sir.

Q. And who selected those particular days?

A. Those days were selected by the plaintiffs' engineer and myself.

Q. Isn't it a fact that you selected them and sent on a list?

A. We sent on a longer list to your engineer and we selected these days after an examination of the sheet which would be typical days for developing certain factors which both sides wanted to get.

Q. In the first place you picked out these six days as showing conditions after the flashboards were put on, isn't that correct?

A. I think that is correct.

Q. And on every one of those days this pool was higher actually than it would have been if there had been no plant there and no flashboards?

A. You got them by individual days.

[fol. 255] Q. Isn't that so—the pool elevation was actually higher than it would have been without any plant and without flashboards?

A. Yes.

Q. And that increase in elevation varies from one foot to a half a foot?

A. Yes.

Q. And that increase in elevation represents a backing of water on the plants of these plaintiffs?

A. Yes, sir.

Q. And you selected these as typical days for that period?

A. No; we were studying certain conditions that we wished to use those days for.

Q. There was not a single day when the power plant pulled down as much water as the flashboards obstructed?

A. I think there was not a single day when the power plant operations were normal in this group.

Q. Didn't you try——

A. The average for the year 4,810.

Q. If they were not typical why did you pick them out yourself?

A. Because we were studying the backwater conditions in the pond.

Q. And on every one of those days there was backwater, even under your construction of that term, on plaintiffs' plants?

A. Yes.

Q. Now, I want to go a little further into this particular day. Take the 18th of June.

Paper marked Plaintiffs' Exhibit No. 21 for Identification.

Q. Now, I show you a sheet which has been marked Plaintiffs' Exhibit 21 for identification, which is produced by the defendant, being power-house log sheet, Ford Motor Company, Green Island, N. Y., June 18th, 1925, and ask you if that is one of the log sheets kept in the power station of the defendant?

A. It looks like it, yes.

Q. And showing the operations of that plant during the 18th day of June, 1925?

A. Yes, sir.

[fol. 256] Q. Now, tell me the greatest head on that plant on June 18th, 1925, from this sheet?

A. 16.3 feet, occurring at 11 p. m.

Q. And what was the smallest head that they had on that day?

A. 12.4 feet, occurring at 4 a. m.

Q. That is, during that day the difference in elevation between the water above the plant and below the plant varied from 12.4 to 16.3, is that correct?

A. Yes, sir.

Q. A difference of practically four feet?

A. Very close to it.

Q. Will you explain to the court what that meant with reference to the draft of water—assuming that your load was constant on that day?

A. Assuming that the load was constant?

Q. Yes. Assuming that the amount of power required in your plant was the same, what effect would this variation of head have on your draft of water from the pool?

A. When the head is low you would have an increased draft of water from the pool. When the head is high the draft would fall off.

Q. How much of a variation in your draft of water from this pool would there be during that day with a four-foot variation in head—to get the same amount of power?

A. Do you want to assume any particular load for that condition of constant power?

Q. No, just give me the perecentage?

A. I can't do it because the percentage would vary with the amount of load. If you want to assume 1,400 kilowatts on each unit as a constant load—if you refer to the chart attached to the stipulation, you will see that 1,400 kilowatts on the wheel with a 12.8 head would correspond roughly to about 1,700 second feet per unit; and 16.3 of a head would correspond roughly to about 1,330 second feet per unit.

[fol. 257] Q. The smallest head occurred at 5 o'clock in the morning, did it not?

A. Yes, sir.

Q. Now, what was the actual load on the plant in kilowatts at 5 o'clock?

A. I can quickly give it to you in second feet—4,480 second feet at that time.

Q. And what was the load on the plant?

A. Five hundred and twenty-five per unit. That would be 2,020. I have taken it off roughly here without reference to those log sheets.

Q. Now, reduce that same load of 2,100 kilowatts, how much water would you have to draw out at 12 o'clock. When your head was 16.3?

A. Approximately 675 kilowatts per unit.

Q. No, I guess you misunderstood me. I asked you how much water you would have to draw at 12 o'clock at night, under a head of 16.3 to produce that same load of 2,100 kilowatts?

A. That would be about 1,070, roughly, per unit; 4,280 cfs. In other words, the assumption at the higher head is 4,280 and at the lower head is 4,480.

Q. On this sheet which has been marked Plaintiffs' Exhibit No. 21 for identification, it appears that at 5 o'clock there was a load of 2,100 kilowatts on the generators and at that time your head was called 12.4 feet?

A. Yes, sir.

Q. Now, it also appears from this same exhibit that at 12 o'clock that night, your head had increased to 16.3 feet?

A. Yes.

Q. Now, with that head which existed at 12 o'clock at night what draft of water was necessary to produce the 2,100 kilowatts?

A. 4,680 cfs. for the 12.4 foot head, and 4,360 cfs. for the 16.3 foot head. These figures have been roughly interpolated on this curve attached to the stipulation.

[fol. 258] Q. Now, that variation in draft that is drawing a greater or less amount of water results from the variation in your head, doesn't it?

A. Yes.

Q. And that variation would be greater if your wheels were operating near capacity?

A. Yes.

Q. At that particular time about what percent of capacity were you operating?

A. About one-third; about 33 per cent capacity; something on that order.

Q. Your variation would be greater in higher loads?

A. Yes.

Q. Now, that variation of head results principally from what condition at the defendant's plant?

A. Variation in the head is the result of fluctuation of pond level plus your tidewater in the tailrace.

Q. Referring to Plaintiffs' Exhibit 21, will you tell us how much the tail water varied, that is, the water below the pond, between 5 o'clock in the morning and 12 o'clock at night?

A. 5.47 at 5 o'clock in the morning.

Q. And what was the tail water elevation at 12 o'clock at night?

A. About 1.77.

Q. And that represents a variation of how much in tail water?

A. 3.7 feet.

Q. That is, the elevation of the water below your power plant varied 3.7 feet during this day?

A. Yes, sir.

Q. Now, what was the variation in your headwater above your plant?

A. It varied from 17.87 at 5 o'clock and 18.07 at 12 o'clock, a variation of .2 of a foot.

Q. And that variation in your tail water resulting from the tide affects the amount which you draw from this pool, does it not?

A. Yes, sir.

Q. And the higher the tide the more you have to draw from the pool?

A. Yes, sir.

[fol. 259] Q. And when the tide drops you draw less from the pool?

A. Yes.

Q. And drops it to its lowest point?

A. Yes.

Q. So that to a very large extent when your load conditions are running about the same during the day your draft of water from the pond is affected by this tide below the dam?

A. Yes.

Q. And, therefore, this benefit which you claim from drawing down the water of the pool is more or less dependent upon the tide conditions below, isn't it?

A. No. The benefit—of course, if you have a power demand it varies and if you want to take a little bit more water in order to meet it, it comes out of the pool irrespective of the head at that particular moment.

Q. Your power varied during the day?

A. Yes.

Q. Your draft on the water in the pool also varied because of this tide water below?

A. Yes.

Q. And these alleged benefits which the plaintiffs are supposed to get from the drawing down of the water of the pool are dependent a good deal upon the time the tide goes up and down below, aren't they?

A. Dependent more on the load conditions in the plant.

Q. Assuming the load conditions are about the same, with a variation of say five per cent during the day and night, your draft of water from the pool——

A. In that case it would be dependent on the tide water below.

Q. So the plaintiffs' plants getting their tail-water as a result of your operations, get a tidal effect which they would not have except for this backing of the water upon them, isn't that correct?

A. Certainly.

Q. Take this particular day, and will you tell me if it is not a fact that that record shows, which has been marked Plaintiffs' Exhibit 21, that during the period of low head, [fol. 260] as a result of the height of your pool that it went down to 17.87 Barge canal datum?

A. Yes.

Q. When your head was smaller?

A. Yes.

Q. And then when your head was increased by the tide dropping the pool backed up to 18.27 feet?

A. 18.27. The head was 16.3.

Q. The head water, that is the tail elevation?

A. Run up to 18.27.

Q. Now, take this condition at 5 o'clock, on Plaintiff's Exhibit 21, you had a head of 12.4 feet and at that time the pool was 17.87?

A. Right.

Q. And that was a period of low head as a result of the tide?

A. Right.

Q. And you were pulling the pool down, is that correct?

A. Yes.

Q. Now, at 12 o'clock noon you had a head of 16.97?

A. 16.1 head.

Q. That is right. So that in that period your head had changed 3.07 feet?

A. Yes.

Q. From 5 o'clock in the morning to 12 o'clock noon?

A. Yes.

Q. Now, during the period of low head, that is at 5 o'clock, you had pulled the pool down to 17.87, is that correct?

A. Yes.

Q. And at noon when you had a high head and were drawing less water the pool had gone up to 18.27?

A. As a matter of fact—of course our load varied somewhat. We were running 5,000 second feet at noon.

Q. And what were you drawing at 5 o'clock?

A. 4,680 second feet.

Q. As a result of this change in the load conditions your plant had drawn the pool down .4 of a foot and then pushed it up .4 of a foot, hadn't you?

A. It went up to about .4 at noon.

Q. When you had the highest head?

A. Yes.

[fol. 261] Q. And then as the tide water below——

A. That was because of the increased load on the turbines.

Q. Due to the increased——

A. Load on the plant.

Q. If you drew more water you would pull the pool down, wouldn't you?

A. Yes.

Q. But instead of that, even though you were drawing still more of a load, the pool was raising?

A. Recovering from the discharge up the river.

Q. And that was because your head was improving?

A. No. So far as the pool influence was concerned it was due to more water coming into the pool from up river than the station was taking out of it at this point.

Q. Look at Plaintiffs' Exhibit 21 and see if that pool does not come down when the tide goes up and the pool goes up when the tide comes down, and see if that is not the fact?

A. It may be on this particular day.

Q. Just take it on that day?

A. I don't think I can get that inference out of it. That is entirely dependent on the tide.

Q. Take the periods of 5 o'clock morning, 12 o'clock noon and 12 o'clock at night and see if you do not find there that when the tide is in and it is high tide you are drawing more water and pulling the upper pool down, and when the tide goes down you pull less water and the pool goes up again, see if that is not the fact?

A. The pool changed from 17.87 to 18.27, or an increase of .4 of a foot approximately while the tide was going out in the early morning, with increasing head.

Q. Even though at noon you were getting more power out of the plant, isn't that the fact?

A. And more power coming out of the plant; at 6 o'clock in the evening the pool had dropped to .1 only of the complete recovery of the tide.

Q. How about your load?

A. The load was changed only from 5,000 to 4,680. It fluctuated between those limits.

[fol. 262] Q. How about midnight?

A. The pool had gone down one more tenth and the tide had again turned and the load had only fallen off on the plant about a hundred second feet and the head was now the greatest head. So the tide is not the only influencing factor.

Q. But it is a very large factor?

A. It is a factor.

Q. And that upper pool, the variation of that pool varies, because of the operation of your plant, very largely with the tide and in accordance with the manner in which the tide affects your tailwater?

A. This one particular day.

Q. That would be true in any day when your load was fairly constant, with a variation of four feet, you are bound to draw a lot of water when the tide is in and a smaller amount when the tide is out?

A. You have the same variation in the pond resulting from your power plant operations upstream and that is another equally pertinent factor to take into consideration.

Q. On this day the variation of the pool coincides with a low tide?

A. Not altogether.

Q. Fairly closely?

A. I don't know what the influence of the pool was.

Q. On this particular day it appears that the lowering and raising of the upper pool varies at about the same time of the variation of the tide below the plant, doesn't it?

A. On this day it follows very close to tide variations.

Q. On this particular day the variation was as much as .4 of a foot?

A. Yes.

Q. And you know that in the operation of the plaintiffs' Fibre mill or the paper mill, they cannot vary their operations with this tide, don't you?

A. I know nothing about the operations of the plaintiffs' plants.

Q. Do you know anything about the operation of a paper mill?

A. Yes.

[fol. 263] Q. And you know they run twenty-four hours a day steadily?

A. Some of them do. Generally speaking, we speak of it as twenty-four hour operation.

Q. They run constantly as one unit and the machines have to run at a certain speed and have to be fed with stock at a certain speed?

A. I don't know about the process.

Q. But you know that is all in one unit and the stock has to be carried right straight through to the end of the machine?

A. I don't know of my own knowledge.

Q. You don't imagine that a paper mill could have its operations interrupted?

A. I should think it would be desirable to have it free from any fluctuations if possible.

Q. It appears from these picked days which you selected and which appear in the stipulation here, on one of those days your power station was drawing 2,000 second feet, and another day 2,640 second feet, on another day 880 second feet, on another day 3,670 second feet; on another day 4,320 second feet, and on another day 2,720 second feet. When you gave the court these various average curves you ignored that variation in the operation of the defendant's power plant, didn't you?

A. Twenty-four hour operation, you are just speaking of?

Q. Yes.

A. Yes, sir. It would be impossible for any engineer to figure those variations precisely on account of the various factors of influence, tidal effect and so on. All any one can do is to figure average conditions.

Q. But in order for the plaintiffs to get the full head that is available, as you claim, even with the flashboards on they have to accommodate their operations to the draft of water through your plant, don't they?

A. That would be perhaps so—due to the decreasing [fol. 264] amount as the plant is loaded up. The Ford plant at present is only practically one-half loaded.

Q. For instance, on this day when the Ford plant was only drawing 880 second feet you were backing almost the full two feet on the paper mill?

A. There are spasmodic instances.

Q. And on that day they would be up against it for power?

A. Yes.

Q. And another day you were drawing 6,240. On that day they might be able to run pretty nearly full; but even on that day there was backwater from those flashboards?

A. Yes. There were times when there was backwater on these mills and I have said so all day in my testimony.

Q. So the plaintiffs would have to accommodate their operations to your operations, wouldn't they?

A. I don't think that is necessary to our case. It is generally understood that a person is entitled to the use of the river as it goes by him, to the reasonable use of the river. The plaintiffs are entitled to the reasonable use of this water. I am not, of course, competent to state what they are entitled to. I said we generally understand that a person is entitled to a reasonable use of the river.

Q. If the plaintiffs were obliged to accommodate their operations and their plants to the operations of Henry Ford & Son, is that what your average curves would require, in substance?

A. Not if considered with the rest of my testimony. As the load on the plant increases those influences will tend to decrease. As to these other factors that I mentioned, all tend to vary the amount of backwater here. It is not susceptible of direct analysis as I see it.

Q. We analyzed it pretty well on six days?

A. Those are spasmodic occurrences. I can take other days and the opposite would be true, when there would be a gain.

[fol. 265] Q. In order to have these average curves that you put in here correct, the court has got to assume that the plaintiffs' plants will accommodate their operations to the operations of the Ford plant precisely and exactly every moment?

A. I don't think I agree with that.

Q. Take that particular day?

A. That is one instance.

Q. June 23rd?

A. There are other instances where the reverse is true.

Q. One day it is one way and another day it is another?

A. Yes. I have tried to show the average conditions.

Q. And in order to have those average conditions actually applicable they must exactly conform their operations to the Ford plant's operations?

A. And as the load on the Ford plant increases, as they increase their installations, the conditions of backwater will become less and less, of course.

Q. And as the Ford plant uses less water the backing becomes greater and greater as the Ford plant uses less and less water?

A. Yes; but that is a condition that does not prevail except for spasmodic occurrences.

Q. That is true on those six days?

A. With the plant half loaded, and on some days much less.

Q. You picked them out yourself?

A. For certain studies, yes.

Q. Isn't this true: Even assuming that all these curves that you put in were correct, there is not one of these plaintiffs than can tell from one day to another whether there is going to be two feet of backwater from the Ford plant or any backwater from the Ford plant, isn't that correct?

A. That is correct.

Q. And they may one morning have two feet and another have no backwater?

A. That is correct. That is approximately, I won't say exactly two feet, but approximately.

[fol. 266] Q. Now, you described the use of these flashboards for storage purposes. Those flashboards were also used even though there was no substantial pondage back of them, for the purpose of increasing the head, weren't they?

A. Yes.

Q. Now, let us assume a condition where the Ford plant requires for operation 3,000 second feet of water and there is only 3,000 second feet of water flowing in the river. What would be the proper way for the plant operator to handle that flow?

A. Carry the water in the pond at as high a level as possible.

Q. And he would keep the pool level to the top of the flashboards and draw the entire flow through its wheels?

A. Yes.

Q. If there weren't any flashboards he would keep the pool at 15.2 and still draw all the water through his wheels?

A. He is not permitted to draw the pool level below 15.2, and he can only use that portion of the water which is in excess of that elevation; so that there would be water wasting over the dam without flashboards, and he would be only able to take what he could.

Q. That would be a matter of a small fraction of an inch?

A. In some cases it is a material amount.

Q. The proper operation of the defendant's plant would require him to keep that pond level as near the crest of the dam as he could so there would not be any water going to waste?

A. Yes.

Q. And that would keep the pool approximately 15.2?

A. You understand that there is a certain elevation in the pool established by the government.

Q. I am assuming 3,000 and he wants all of it.

A. Then the elevation would be 15.2 without flashboards.

Q. And if you put the flashboards on, the proper operation of them would require the operator to keep the pool at 17.2?

A. Yes.

[fol. 267] Q. And still pull the 3,000 through the wheels?

A. Yes.

Q. In that case he would not be getting any benefit from storage?

A. No.

Q. He would be getting simply an increase in head of two feet?

A. That is correct.

Q. So that in cases where the flow of the river is down below, say 5,000 second feet, you are holding that pool at 17.2 by means of these flashboards and using the entire flow of the river where otherwise the pool would be at only 15.2?

A. Yes.

Q. Which represents an increase in that elevation of two feet?

A. Providing the station use and the flow in the river were equal.

Q. In the lower flows of the river don't you use all that there is in there?

A. Yes, more than is in there. The effect of operation is to actually use more than is coming down the river and thereby pulling down the pool level.

Q. The net result is, you get two feet more head on your water wheels in the plant?

A. As a matter of fact, in actual operation you won't get it.

Q. That in general is about .4 of an inch?

A. We have always figured from our studies that the gain in head is about one foot and that the other foot is lost.

Q. There is a variation of a foot behind those flashboards?

A. Yes.

Q. Now, that variation of a foot, is thrown back on plaintiffs' plants?

A. It is less than the two feet.

Q. Take a foot. That variation of a foot is thrown back on the plaintiffs' plants?

A. With a maximum not exceeding two feet.

Q. You say you find there is a variation there of a foot or so during the day?

A. There may be.

Q. So the backing might vary from one foot to two feet?

A. As a matter of information I might state that of [fol. 268] course this last year being a low-water year and the load only being about half the plant load, flashboards were not as of great importance as they will be when the plant becomes fully loaded. When those conditions are arrived at the use of that pondage will be greater and the average draw down will be greater.

Q. And, therefore, in the lower stages of the river the greater the backing on plaintiffs' plants?

A. No.

Q. In the lower stages of the river you are using all the water of the river?

A. And more, too.

Q. And during that period of operation you are keeping that pool as near 17.2 as you can?

A. But you cannot do it.

Q. And every minute of that time, you are backing water on the plants of these plaintiffs as against the conditions which would exist if there were not any plant and there were not any flashboards?

A. I won't say that because there are plenty of times when that is not so.

Q. In low flows of this river when you are using all of the water isn't it true that the proper operation of the flashboards and the proper operation of the plant you will be continually backing water on the plants of these plaintiffs?

A. Under present low conditions there will be 61 per cent of the year that there will be backwater effect.

Q. Isn't it true in the ordinary operation of that plant the greatest backing will come under low water periods?

A. I don't think that is necessarily true.

Q. Isn't it generally true? In the operation of flashboards?

A. On account of using that pond so much more heavily your average draw down is.

Q. You cannot draw the pond out?

A. Draw it down to 15.2.

[fol. 269] Q. And then you got to let it up again?

A. During the night hours or some time when the load is not as great.

Q. Then during the night hours it will go up to 17.2?

A. Possibly.

Q. And then you are backing on plaintiffs' property?

A. Yes, for that one hour.

Q. And it will gradually draw down to 15.2?

A. Yes.

Q. So all during that day there is a backing of from nothing to two feet according to your operations, is that correct?

A. That is dependent on the amount flowing through the river.

Q. We are talking about these low flows of the river?

A. Still talking about the assumption of 3,000 flow down the river and 3,000 through the plant, as an average. With these variations in the plant, averaging that amount, then your statement is correct.

Q. Isn't it correct in almost any conditions with a flow under 4,000 feet?

A. It might be, but there are very few occasions when it is under four.

Q. Take 5,000 feet?

A. Referring to our duration curve, 5,000 is about 30 per cent of the time. It might be under that in an average year.

Q. And during those periods you would have the maximum of interference with these plaintiffs as a result of these flashboards?

A. No, because the average station load is going over 5,000 feet and the average flow in the river is less than that. You are using more in the plant than there is coming down the river.

Q. But you are holding your pool level at 17.2 or as near as you can keep it?

A. No. Taking the fluctuations—you can take the actual conditions in which we have a load of five, which as time goes on will increase up to the maximum station use. I [fol. 270] have been informed that since our studies have been made there are 500 kilowatts added to that load.

Q. Take this exhibit of yours which has been marked Defendant's Exhibit 19, and tell me where you got the infor-

mation upon which you based the lower portion of the red line on the right-hand side of that exhibit; that is the portion of the line running to the right from the point which Mr. Whalen has marked B?

A. That is taken more or less as a presumption or expected condition.

Q. It is merely an estimate of yours?

A. Yes, sir.

Q. It is not based on any actual condition at all?

A. No.

Q. And you have marked it "based on estimated drawn down"?

A. That is our estimate.

Q. As a matter of fact, if that plant is properly operated in these lower flows of the river which are represented by that right-hand portion of that curve, your plant operator will keep that pool level as near 17.2 as he can?

A. He will naturally because the load conditions are exceeding water conditions. The river is coming down below 5,000 and your load is up above it. That means the more you use the pond the more that draw down would be.

Q. If you pull your water down to 15.2 there wouldn't be any use of flashboards?

A. Yes, to get your load variation.

Q. How do you get your load variations on any particular day?

A. As I attempted to describe.

Q. Take it on any particular day. You store the water during the day or night, isn't that correct?

A. Yes.

Q. And during that period when you are storing water, you are backing it on the plaintiffs?

A. Yes.

Q. And then later you draw the water down during the same day?

A. In increasing amounts until the pond becomes full and [fol. 271] in decreasing amounts until the pond is depleted.

Q. And that is all in the period of 24 hours? A. Yes, sir.

Q. And during all the day you are backing water to some extent?

A. There will be sometimes where there will be a decided gain on the head coming down the river.

Q. As a hydraulic engineer you state that the plant operator will properly pull that pool down from 17.2 to 15.2?

A. To meet load requirements, yes. And, of course, the other is equally true, that the operator should keep his head as great as possible as much as he can. If he has the load he is going to meet that load requirement even to pull it down.

Q. And then he has got to back water on the plaintiffs until he gets his pond filled up again. So that on every one of these days in the low-water period represented by the right-hand end of this curve on Defendant's Exhibit 19, you are actually backing water on the plaintiffs' property in greater or less amounts?

A. Not necessarily, no; that depends on the plant load conditions.

Q. Show me one condition

A. Let us assume 3,000 flowing in the river, through plant 5,000, be continually down through that whole day.

Q. How long could he run that way?

A. Not indefinitely.

Q. He could only run a few hours?

A. I don't know just how long it would carry him.

Q. He could not run very many hours with that pond, could he?

A. My recollection is that that pond would carry him for—I am speaking entirely from recollection—but my recollection is that his storage would probably carry him several days.

[fol. 272] Q. You mean you could pull 2,000 feet out of that pond for several days?

A. I didn't say 2,000. I said assume 3,000 running in the river and a load of 5,000. He has got a varying load and demand condition during the 24 hours. He might carry 2,000 for a day; might carry it for two days—I am not sure.

Q. He could not draw out more than he has running in the river very long?

A. No.

Q. He would have to stop at some point and start backing water?

A. Yes.

Q. And back until he got his pond full or nearly full?

A. Yes.

Q. And at that time he would be backing water on the plaintiffs every minute he is recovering, he is backing water on the plaintiffs' plants?

A. As it builds up to 17.2.

Q. And the plaintiffs do not get any benefit until he happens to draw it down because of the demand in the Ford plant?

A. Yes.

Q. And so during this low-water period there is a backing constantly?

A. There may be.

Q. There is bound to be if he is using that pool for storage?

A. Not necessarily, if his demand is greater than the run of the river.

Q. He has got to build it up when he pulls it down?

A. Yes.

Q. And when he builds it up he is backing water on plaintiffs?

A. Yes.

Q. That is not shown on this curve here?

A. No, that is representative of an average condition.

Q. And it does not show what actually happens each day?

A. No.

Q. Now, referring to this exhibit which has been marked Defendant's Exhibit 17 on which you have assumed to show the average load at the Green Island plant of Henry Ford [fol. 273] and Son, will you tell me how that exhibit was made up? Have you the computations upon which it is made up?

A. That is taken primarily from the station log sheet for the year 1924 and 1925 up to the end of September. The load has been averaged for each month by taking the average load for each day and averaging those. It has been divided into direct current and alternating current. Those first columns merely are calculations of the accumulation of that data from the log sheet; the other calculations are shown right here. Kilowatts is the conversion factor multiplied by .746. The head has been computed from the average Ford log sheet; and the flow cfs. derived by the

utilization of the diagram attached to the stipulation. We have gone into this kilowatt output against discharge on the stipulation and arrived at the average second feet flow. These figures have been totalled and averaged here in the table.

Q. Did you take off from the original log sheet the horsepower of the direct current and alternating current and the average gross head?

A. Yes, for each day of the month and those were totalled and averaged and carried on into this table.

Q. Now, will you let me have your computations for the month of August, 1925?

Paper produced and marked Plaintiffs' Exhibits No. 21A and 21B.

Q. Referring to Plaintiffs' Exhibits 21A and 21B, these are the computations from which you made up Defendant's Exhibit 17?

A. Part of the information.

Q. Take the month of August. Your average load as shown on Defendant's Exhibit 17, for alternating current is 530 horsepower, is that correct?

A. August 1925 is 530.4 alternating current.

[fol. 274] Q. As a matter of fact, during the period from August 2nd to August 9th, you were only drawing about an average of 125 horse-power on your alternating current generators, weren't you?

A. That is correct.

Q. So that during that period from August 2nd to August 9th your draft water was below this average of 4,810?

A. I cannot say without comparing with the alternating current. I might say that these generators are unique in that there is an alternating current and direct current made all on the same shaft, and these units were developed simultaneously either alternating or a direct current, one or the other. In other words, they can be all direct, or all alternating current or a combination of the two. These columns represent the split between the two types of current.

Q. On the second, third and fourth of August, the plant was practically shut down, wasn't it?

A. For some reason they were running at light load.

Q. And during those days you were way below the average in your draft upon the pool?

A. Yes.

Q. And in those days the back water upon the plants of these plaintiffs was very large?

A. They would be the greatest.

Q. Under those conditions the backwater is practically two feet?

A. I cannot tell without the other factors.

Q. Give me the gauge height on the 2nd, 3rd and 4th of August, 1925?

A. 18.6, 18.6, 18.5 and 18.0—from the 2nd to the 5th.

Q. At that time the flashboards were partly off?

A. Yes, sir.

Q. How much was your draft water on those three days, through the power plant?

A. Abourt a thousand second feet.

[fol. 275] Q. How much was the flow in the river?

A. 9,640, varying from that down to 7,800.

Q. During that period from the 2nd to the 4th of August, you were backing practically two feet on the plants of these plaintiffs?

A. With that for a condition without flashboards that you had reference to?

Q. Yes, and before there was any Ford plant there at all?

A. No, sir. I should not say it was as much as two feet.

Q. About how much was it on each one of those three days, 1st, 2nd, 3rd, and 4th?

A. Actually the pool was at 18.6 as a maximum and 18.0 a minimum for those several days. With no plant operating that same discharge would have been approximately 18 feet and 17.7. In one case I can say there was about .6 and in the other about .3.

Q. .6 or .9?

A. Eighteen in one case without the flashboards, making a difference of .6.

Q. Now, on every Sunday during this period in June, July and August and September, from which you have made these tabulations there is a substantial backing on the plants of these plaintiffs?

A. Sundays and holidays?

Q. Yes.

A. There might be. I could not say without a detailed examination. In about the same amount as in the case of this last question.

Q. Well, during this period from June 16th to the end of September that pool level was kept at or above the crest of the flashboards with very few exceptions, wasn't it?

A. Yes.

Q. Now, you did not plot any curve to show the backing of water on the plants of the plaintiffs during that period when they were actually on, did you?

A. No, I did not; except as reflected in these average curves. That shows the flashboard condition.

[fol. 276] Q. Do these three curves which have been marked Defendant's Exhibits 19, 24 and 25, represent the actual conditions during the period in 1925 when the flashboards were actually on?

A. Yes, being that they were based on the plant load of 4,810 second feet, representative of the load during the last—more than a year, a year and nine months.

Q. This curve on Defendant's Exhibit 19 shows that for five per cent of the time the water is kept at elevation 15.2 is that correct?

A. I think it is.

Q. Now, show me a single day during that period when the flashboards were actually on that the pond was ever as low as 15.2?

A. That is not the question. That is tied back showing that there were days when the flow gets below the requirements of the station.

Q. These curves did not represent the actual conditions which existed when these flashboards were on?

A. Not day by day.

Q. They represent so far as those lower flows are concerned your estimate of what would happen?

A. Based upon actual conditions that did exist when the flashboards were on last year.

Q. You have been very careful to mark at the lower part of the line what that line is based on, and that is your estimate?

A. Yes.

Q. And that portion of the curve is not based on any actual conditions, but on your estimate of what future conditions may be?

A. Yes. Those curves do not, however, take into account any increase in the growth of load. They were based on the load as existed last year.

Q. They do not correspond with the actual conditions which exitsed during 1925 when those flashboards were on?

A. Those curves are not an analysis of the power conditions in 1925 day by day, no, sir.

[fol. 277] Q. And as to the portion of those curves which appear to show a benefit to these plaintiffs by reason of a draw down, they are not based on any actual condition there, but merely on your estimate or opinion as an expert, isn't that correct?

A. Based on an average run off and on the average operating conditions at the plant.

Q. Your estimate?

A. Yes, sir.

Q. It does not correspond with any actual conditions at the plant?

A. Not for any actual day. You can fit the conditions back in.

Q. Just fit me one day in, where that pond was at 15.2.

A. There wasn't any in this last period.

Q. There was hardly a day in that period when it was below 17.2?

A. That was an abnormal year, as I testified this morning.

Q. When you testified here today of the average backing on the plaintiffs' plants, of only .04 of a foot, that testimony was based upon these curves?

A. It is given right on the data sheet.

Q. And that estimate included these estimates as to plant operation which do not correspond with the actual conditions of 1925?

A. They do correspond to the conditions in so far as use and load are concerned.

Q. These curves here do not correspond with conditions in 1925.

A. They are not an analysis of the 1925 period.

Q. And they do not fit with that period?

A. No, because that was an abnormal high water year.

Q. They are based on your opinion or estimate?

A. Over a long term of years. What you might get on the average.

Q. Your backing of .04 of a foot is based upon your estimate?

A. Yes, it is an estimate for a long term. It is, however, the customary way of analyzing those things.

[fol. 278] Q. It is, however, customary to take the actual conditions when you can get them?

A. They are based upon the conditions prevailing during last year and applied to a typical average run of the year.

Q. You had the records available to show the amount of backwater for every day during which those flashboards were actually on the dam in 1925?

A. So did you.

Q. And did you make up such a tabulation?

A. I did not.

Q. And instead of that you took this estimate or opinion?

A. It was more reliable because the conditions of 1925 were so abnormal.

Q. And in what did their abnormality consist?

A. Being a high run off year as affecting power and also because the plant is not fully loaded.

Q. Do you know whether or not it will be fully loaded next year?

A. I cannot testify to that. I heard there has been an added load since we made these reports.

Q. In making up this Defendant's Exhibit No. 19 did you indicate on there the flood conditions as well as normal water conditions?

A. The left-hand portions of the curve include flood conditions.

Q. Did you include those all through your averages in these curves?

A. The averages of curves from which the average of .04 that you referred to is included. That testimony which I gave this morning was not, what the average loss of head was .34. It was not included. Neither the low water nor the high water portion of the curve is reported in that first figure.

Q. In order to get this backing down to .04 you had to include flood conditions in this river during this period?

A. In the average conditions I did.

Q. In the flood conditions the defendant's plant was shut down?

A. Yes.

[fol. 279] Q. And yet you included those conditions in making up these curves and averages?

A. Which is a proper way of doing it.

Q. It would not fit any actual condition, would it?

A. You can obtain average for any length of time you desire.

Q. Referring to Defendant's Exhibit 19, will you tell me over what percentage of the year the presence of these flashboards backs water on the plaintiffs' plants?

A. I think I took it off as 61 per cent of the year. From that intersection point it is about 17 per cent; this intersection point here, reading back in the reverse direction, is 23. So that 17 and 23 is about 40. I think this morning I scaled it 39 per cent, for the intersected portions to the right and to the left; 61 per cent on the included portion.

Q. So that for 61 per cent of the year you admit that these flashboards back water on the plaintiffs' plants?

A. To some extent. I would expect it under present conditions of the plant and the modified conditions mentioned this morning.

Q. And that appears on Defendant's Exhibit 19 in the portion of the curve from A to B?

A. That is correct.

Q. And on that same curve I am marking a C at the right-hand end of that red line, and I ask you if it is not a fact that the portion of the red line from A to C is the portion which is based upon your opinion and estimate?

A. It is.

Q. And not upon any actual records of the backing by these flashboards during the period which they were on?

A. That is correct; that is my estimate.

Q. That is the estimate that does not correspond with the conditions in 1925 as you found them?

A. Yes, that does not reflect the actual conditions of 1925 [fol. 280] as being a direct analysis of the 1925 conditions. But it does profess to work into the average year the conditions that applied to 1925.

Q. That does not represent what actually occurred last year, does it?

A. No, sir.

Q. If you were to draw line which represented last year, you would have to draw a red line right across at 17.2 or pretty close to it?

A. I haven't studied it from that point of view.

Q. If you continue that red line according to the actual conditions in 1925 when these flashboards were on, it would be above the black line, wouldn't it?

A. Those instances where there was back water, it would be above that black line. I don't know how the average line would run.

Redirect examination by Mr. Whalen:

Q. Have you got a copy of Plaintiffs' Exhibit 15?

A. Yes.

Q. Now, assuming the conditions shown in Plaintiffs' Exhibit 15, there is no water through the station and no flashboards on the dam in July, 1925. Can you tell us how much lower the water would have been at the dam than it actually was, with flashboards on?

A. The average flow for the month of July was 11,000 second feet. With no flow through the station and no flashboards on the dam, the gauge height would have been approximately 18.1. This figure we give here is 18.58 or .48 higher. Under the assumption that you gave me it would be .4 of foot lower in the water surface elevation—.4 of a foot lower with no plant and with no flashboards than shown on this exhibit.

Q. All through this trial we have used the expression, cubic feet per second and the expression second feet. Are they the same?

A. Yes, sir.

[fol. 281] Q. With 4,800 second feet going through the station can you tell us the maximum flow that the boards will sustain before they fall?

A. About 26,300 second feet, 19.2. The discharge from the table here is 21,500 plus the 4,800 through the plant would make about 26,300.

Q. That is, with flashboards, the maximum that the flashboards will carry?

A. The total discharge will be something in the neighborhood of 11,200 over the flashboards, plus the 4,800 in the station or a total of 16,000.

Q. The flows above that would there be any flashboards there?

A. No.

Q. The six days in the stipulation at the end of Paragraph 7 thereof concerning which Mr. O'Connor questioned you at length, were selected by whom?

A. They were selected really by the engineers of the plaintiffs and the defendant. We went through first the log sheets and picked out a series of days on which we thought the information might be workable, when the conditions were more or less definite, and then the plaintiffs' engineer in the discussion of those decided to throw out certain days and we arrived on the days set forth in the stipulation.

Q. Was it with the idea of selecting days which were typical of river flow conditions?

A. Yes, rather than power conditions.

Q. Were they selected for the purpose of showing backwater?

A. Not for direct computation, no sir. Only to determine what the slope over the pond might be for different flows and that is shown on one of our exhibits.

Q. You testified that tidal conditions affecting the plaintiffs' plants caused a change on the load at defendant's plant, as the tide varied. Now, is there any difference in that respect whether there are or are not flashboards in [fol. 282] position?

A. Of course you lose the average on the head resulting from the use of flashboards.

Q. Through this trial we have used the word, term, load, many times. Will you please define it?

A. The load on the power station is the amount of power being generated by that plant either in terms of horsepower or kilowatts. It is an instantaneous measurement of the amount of output of that plant in those terms.

Q. Referring again to the days that were selected by you and the plaintiffs' engineer, under paragraph 7 of Plaintiffs' Exhibit 1, to the data there given, were they used to determine the amount of backwater?

A. No, only the slope through the pond. I would modify that to the extent of saying, of course, backwater under particular conditions, as for those days, as discussed in my testimony previously; but not for determining average or general conditions.

Q. By making computations based upon the figures contained in paragraph 7, did you arrive at any determination of backwater?

A. No, sir.

Q. Is it possible to pick out the particular days to show gain of head? The particular days selected by Mr. O'Connor show backwater?

A. Yes, it is perfectly possible to select other days which will show a gain in head rather than a loss.

Mr. O'Connor: Didn't you make any study of any particular day other than these days selected?

A. Yes, I did.

Q. Didn't you say to Mr. Whalen that you had not selected any such days?

A. I don't think there was any such question. He asked me if it was possible to pick out days in which there might be a gain rather than a loss of head. I have made studies on certain days during this period covered by flashboards.

[fol. 283] Mr. Whalen: In the course of your observations at the dam have you noticed a bulkhead constructed in connection with it?

A. Yes.

Q. What does that signify to you as an engineer?

A. That it was put in there intending that a power plant should be built at some future date.

Mr. O'Connor: With a flow of 16,000 second feet in the river, the flashboards are supposed to go off?

A. About that.

Q. Beyond that point the flashboards are out of the situation entirely?

A. Supposed to be.

Q. So that this portion of the curve on Defendant's Exhibit 19, from A to —.

A. That horizontal line is supposed to be the failure of the flashboards, and we allowed a little leeway for the supposed point of failure.

Q. So that this red curve on Defendant's Exhibit 19, the portion of the curve from B to D, concerns conditions where there weren't any flashboards there at all?

A. That is correct.

Q. And the only portion of that red curve that shows any benefit to the plaintiffs are those portions where the flashboards were gone in flood waters and the portions where you made an estimate as to conditions in the future?

A. That is correct.

CHARLES J. WEAVER, recalled for further examination by Mr. O'Connor:

Q. In the stipulation which has been marked Plaintiffs' Exhibit No. 1, there appear certain selected days in the flow of water through the power house of the defendant and over the dam at Troy. Who selected those days?

A. I believe Mr. Cherry did.

[fol. 284] Q. Did you select any of the days?

A. No, I had nothing to do with them.

Q. Who is Mr. Cherry?

A. He is an engineer employed by Stone & Webster.

Q. I show you a profile and ask you what that profile shows?

A. That is a typical profile which has been entered in evidence with the conditions on June 21st, 1925, shown thereon. They particularly referred to the water level surface. That is, the condition with the flashboards and with the plant, that is shown by the red line. The second condition, without plant or flashboards, as indicated by a broken blue line. And the condition with plant and without flashboards, shown by a black line. This also contains or shows the gauge height at the Federal dam, the gauge height at Lock 2, the discharge through the turbines as furnished to me by Stone & Webster, the discharge over the dam obtained from same source; computed gauge height of the discharge, computed from the rating tables furnished me by Stone & Webster for the discharge of the amount of water which was passing over the dam on that day; and also

the gauge height computed from the rating tables furnished me by Stone & Webster of the total discharge of the river passing over the dam, but without flashboards. I believe that covers the sheet.

Mr. O'Connor: I offer it in evidence.

Received and marked Plaintiffs' Exhibit No. 22.

Q. Did you prepare a similar profile for each one of the selected days in that stipulation, during the year 1925?

A. Yes, I did.

Q. And did you obtain the information from the same sources?

A. Yes, sir.

[fol. 285] The Court: Is it your contention that the question of damage to these plaintiffs is determined by those six particular days—the backwater to be determined by those six particular days that you are talking about?

Mr. O'Connor: I understood that Stone & Webster selected these particular days as typical of the condition.

Mr. Whalen: They are part of paragraph 7.

The Court: Do they govern all days?

Mr. Whalen: Just what the heading of paragraph 7 says.

The Court: Apparently the stipulation limits to those particular days.

Mr. O'Connor: It was drawn with the idea of limiting within those particular days. I do not understand that they have gone beyond it in any particular days in 1925. I do not claim they are precluded from going into any other days.

Papers marked Plaintiffs' Exhibit 23 to 27, inclusive.

Briefs to be submitted.

[fol. 286] PLAINTIFFS' EXHIBIT 1

Flashboard Litigation

IN SUPREME COURT OF NEW YORK

LITTLE FALLS FIBRE CO., ASBESTOS SPINNING AND WEAVING CORP., MOHAWK PAPER MAKERS, INC., Plaintiffs,

against

HENRY FORD & SON, INC., Defendant

Stipulation

For the purpose of simplifying the methods of proof in this case the parties have agreed upon the following stipulation:

1. All elevations of surfaces and structures shall be referred to Barge Canal Datum which is the datum customarily used by the State of New York in the vicinity of the premises involved. This datum is 0.87′ below the datum known as "mean sea level at Sandy Hook," which latter datum is used by the United States Engineers in the same vicinity. A third datum known as "low low water," occasionally found in records, is 2.0′ below the datum "mean sea level at Sandy Hook" or 1.13′ below Barge Canal Datum.

2. Flow or discharge of water shall be expressed in terms of cubic feet of water per second (abbreviated—"c. f. s." or "Second feet").

[fol. 287] 3. Records of gage heights and discharges obtained by the State Engineer of New York, the United States Geological Survey, and the Engineer Corps of the United States Army at the following points:

Waterford Lock No. 1—Hudson River (Gage No. 101).
Waterford Lock No. 2—Mohawk River (Gage No. 131).
Cresent Dam—Mohawk River.
Mechanicville—Dam of West Virginia Pulp & Paper Co.—Hudson River.
Mechanicville—Dam of Adirondack Power & Light Corp.—Hudson River.

Vischers Ferry—Mohawk River.

Troy Federal Dam and its predecessor, the State Dam—Hudson River.

Delta reservoir.

Hinckley reservior—West Canada Creek.

may be copied by either party and the copies produced in evidence. The same records as published in the State Engineer's reports of the State of New York may be also used by either party in their published form.

The zero of the gages referred to is at Barge Canal Datum except the gages at the Troy Federal dam, the elevations of which appear on the annexed diagram marked "Sketch Showing Tide Staffs at Troy Dam" made by the United States Engineer's office at Albany.

4. Private Records:

a. Records of gage heights of tailwater gage installed and maintained by the Mohawk Paper Makers, Inc., at their Waterford mill may be read in evidence without the pro-
[fol. 288] duction of the persons who actually made the readings and entries. The constant 14.87′ must be added to this gage to reduce readings to Barge Canal Datum prior to October 13, 1925. After that date the constant 14.98′ should be added. The gage at the Mohawk Paper Makers, Inc., and gage 131 at Waterford Lock No. 2 are affected alike by any change of water surface elevation in the north sprout of the Mohawk river, and the relative difference in actual elevation between these two gages for any normal condition of flow is negligible.

b. Records of headwater and tailwater elevations as automatically recorded at the power plant of Henry Ford & Con, Inc., may be received in evidence without the production of the persons who actually took off the records from the gages.

c. Daily log sheets kept by the station operators at the power plant of Henry Ford & Son, Inc., may be received in evidence without production of the persons who actually made the readings and entries.

d. Either party will permit the other to examine its original records referred to in a, b, and c above.

5. The rating table for the Troy dam without flashboards prepared by the defendant's engineers, a copy of which is attached to this memorandum, is accepted by both parties as substantially correct for the purposes of this case.

[fol. 289] 6. Dam, Structures and Power Plants:

a. The dam known as Kings dam furnishing the head for the plaintiffs' plants has a crest elevation at the timber crib section of approximately 30.0′ B. C. D. while the crest of the concrete section is approximately 0.10′ higher.

The elevation of the water in Kings canal—the intake to the plaintiffs' power plants is kept nearly constant at elevation 29.6′ approximately.

b. The installation of water wheels in the plaintiffs' power plants and their capacities under various heads are as follows:

No. of units.	Type and size of water wheels	Capacity in horse power for various heads				
		10′	11′	12′	13′	14′
	Mohawk Paper Makers, Inc.					
1	30″ Sampson	57.5	66.3	75.5	85.2	95.2
2	35″ Sampson	77.9	89.8	102.0	115.0	129.0
1	55″ Crocker	97.4	106.2	120.0	137.0	154.0
	Little Falls Fibre Co.					
1	45″ Sampson	120.0	149.0	170.0	192.0	214.0
	Asbestos Spinning & Weaving Corp.					
1	Estimated at 65-70 Horse Power under 12′ head.					

c. Elevations of lower spillway and upper spillway of the Federal dam at Troy and elevations of other parts of the dam lock and forebay wall shall be accepted as those elevations shown on Government Drawing No. 10 entitled Details of Dam—Troy Lock and Dam. Such elevations, [fol. 290] however, are not based upon Barge Canal Datum and should be reduced to that datum for purposes of comparison by adding to them 0.87′.

d. The installation of water wheels at the defendant's plant consists of 4 units and based on the results of test of Unit No. 3, the full capacity of each wheel is 2,120 h. p. at the shaft coupling and at the normal head of 13′, and the quantity of water used by each unit at full capacity is

1,870 c. f. s. The kilowatt output against discharge for varying heads for a single unit is shown on drawing M108,-118 attached.

7. Stream Flow:

a. The average discharge at the Federal dam at Troy, N. Y., for the particular days listed below are as follows:

Average Flow at Troy Dam

Date	Through power station	Over dam	Total
1920.			
March 31	.....	66,200	66,200
April 19	.....	40,800	40,800
July 24	.....	6,350	6,350
October 18	.....	4,470	4,470
1921.			
April 5	.....	24,750	24,750
April 8	.....	16,900	16,900
April 12	.....	14,030	14,030
May 11	.....	9,000	9,000
May 19	.....	7,600	7,600
June 2	.....	4,880	4,880
June 24	.....	3,000	3,000
July 23	.....	10,560	10,560
August 23	.....	3,700	3,700
Sept. 3	.....	3,700	3,700
[fol. 291] 1924.			
April 11	5,590	43,370	48,960
April 22	5,140	50,750	55,890
May 5	4,800	53,360	58,160
May 16	4,130	38,110	42,240
May 20	3,850	24,630	28,480
May 31	2,260	12,540	14,760
June 2	3,720	8,300	12,020
June 5	3,680	4,610	8,290
June 8	2,520	5,090	7,610
August 21	3,600	740	4,340
August 24	2,140	1,900	4,040
Sept. 1	2,190	1,780	3,970
1925.			
June 21	2,050	1,960	4,010
July 1	6,240	13,550	19,790
July 4	880	8,710	9,590

Average Flow at Troy Dam

Date	Through power station	Over dam	Total
July 14	3,670	2,860	6,530
August 27	4,320	1,860	6,180
Sept. 10	3,720	3,160	6,880

8. The flashboards installed by the defendant on or about June 16, 1925, on the lower or easterly section of the Troy dam consist of two 12″ planks and their crest is, therefore, approximately 2.00′ above the crest of the concrete section.

9. The Federal dam at Troy was constructed in or about the year 1915 replacing the old State dam which had theretofore existed in the river near the same location. The old State dam had a crest elevation of 13.23 B. C. D.

10. The elevation of the crest of the easterly section of the present Federal dam at Troy is 15.2 B. C. D. The elevation of the crest of the westerly section of that dam is 17.2 B. C. D.

11. The dam and hydraulic canal of the plaintiffs referred to in the complaint and known as Kings dam and Kings canal were constructed in or about the year 1828 by the predecessors in title of the plaintiffs.

[fol. 292] 12. Said dam and canal and the land adjoining same upon which are located the mills of the plaintiff, together with water power made available by said dam and canal, have been owned, possessed, used, occupied, operated and maintained by the plaintiffs and their predecessors in title continuously since in or about the year 1828. It is not intended by this paragraph to specify or fix, at any period or date, the quantity of water available or used, the power capacity available or installed, or the amount of power available or developed.

This stipulation shall not preclude either party from objecting to the relevancy or materiality of the matters to which reference has been hereinbefore made.

Dated March 2, 1926.

Thos. O'Connor, Attorney for Plaintiffs. Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

[fol. 293] Preliminary Rating Table for Troy Dam (B. C. Datum)

Gage ht.	Discharge	Diff	Gage ht.	Discharge	Diff.
15.2	.....	40	19.0	19,300	1,100
.3	40	70	.1	20,400	1,100
.4	110	100	.2	21,500	1,200
.5	210	130	.3	22,700	1,200
.6	340	160	.4	23,900	1,200
.7	500	180	.5	25,100	1,200
.8	680	200	.6	26,300	1,200
.9	880	220	.7	27,500	1,300
16.0	1,100	240	.8	28,800	1,300
.1	1,340	260	.9	30,100	1,300
.2	1,600	270	20.0	31,400	1,300
.3	1,870	290	.1	32,700	1,300
.4	2,160	300	.2	34,000	1,400
.5	2,460	310	.3	35,400	1,400
.6	2,770	330	.4	36,800	1,400
.7	3,100	350	.5	38,200	1,500
.8	3,450	360	.6	39,700	1,500
.9	3,810	380	.7	41,200	1,500
17.0	4,190	400	.8	42,700	1,500
.1	4,590	410	.9	44,200	1,500
.2	5,000	450	21.0	45,700	1,500
.3	5,450	500	.1	47,200	1,500
.4	5,950	550	.2	48,700	1,500
.5	6,500	600	.3	50,200	1,600
.6	7,100	700	21.4	51,800	1,600
.7	7,800	700	.5	53,400	1,600
.8	8,500	700	.6	55,000	1,600
.9	9,200	800	.7	56,600	1,600
18.0	10,000	800	.8	58,200	1,700
.1	10,800	800	.9	59,900	1,700
.2	11,600	900	22.0	61,600	1,700
18.3	12,500	900	.1	63,300	1,700
.4	13,400	900	.2	65,000	1,700
.5	14,300	900	.3	66,700	1,700
.6	15,200	1,000	.4	68,400	
.7	16,200	1,000			
.8	17,200	1,000			
.9	18,200	1,100			

[fol. 294] Discharge Coefficients for Troy Dam

Head on dam	Total Q	Less	Q-main crest	"C"
0	0			
0.5	500	.....	500	2.41
1.0	1,600	.....	1,600	2.73
1.5	3,100	.....	3,100	2.88
2.0	5,000	.....	5,000	3.01
2.5	7,800	570	7,230	3.12
3.0	11,600	1,820	9,780	3.21
3.5	16,200	3,540	12,660	3.30
4.0	21,500	5,700	15,800	3.37
4.5	27,500	8,240	19,260	3.44
5.0	34,000	11,140	22,860	3.49
5.5	41,200	14,420	26,780	3.54
6.0	48,700	18,100	30,600	3.56
6.5	56,600	22,000	34,600	3.57
7.0	65,000	26,100	38,900	3.58

NOTE.—Based upon stream flow measurements furnished by U. S. Engineers Office, Albany, N. Y. These are preliminary calculations subject to future revision when more field measurements become available.

(Attached is sketch showing elevation of tide staffs at Troy dam and blue print showing K. W. output against discharge for one hydro-electric unit at defendant's plant.)

[fol. 295] PLAINTIFF'S EXHIBIT 17

September 22, 1924.

United States Engineer Office, Room 401, 467 Broadway, Albany, New York.

GENTLEMEN: We have the honor to request that we be permitted to install flashboards on the Troy Dam in connection with the operation of our power house.

We are attaching hereto tracing and four copies of blue prints covering the said installation.

Very truly yours, Henry Ford & Son, J. F. Tholl.

JFT.C.

(Attached to this exhibit are two blueprints showing location of Federal dam and flashboard details.)

PLAINTIFFS' EXHIBIT 18

War Department, United States Engineer Office, First District, New York City, Room 710 Army Building, 39 Whitehall St.

JB/AF.

New York, N. Y., Jan. 12, 1925.

Subject: ——.

To: The Ford Motor Company, Green Island Plant, Troy, N. Y.

GENTLEMEN: Referring to your request of Sept. 22, 1924 for permission to install flashboards on the Troy Dam in connection with the operation of your power house, there [fol. 296] is enclosed herewith, copy of regulations approved by the Secretary of War on Dec. 2, 1924, to "Govern the Regulation of Pool Level and Maintenance of Flashboards at the Federal Dam, Troy, N. Y., under Water Power License No. 13, Granted to Henry Ford & Son, Inc."

For and in the absence of the District Engineer,

Very truly yours, Brehon Somervell, Major, Corps of Engineers, Assistant.

Encl: Hudson 377/210.

(Copy of regulations referred to in this exhibit is Defendant's Exhibit 11.)

DEFENDANT'S EXHIBIT 10

Federal Power Commission, Washington, D. C.

I, O. C. Merrill, Executive Secretary of the Federal Power Commission, do hereby certify that the attached matter, covering ten pages, together with the Rules and Regulations of the Commission which were adopted by Orders No. 9 of February 28, 1921, is a true copy of the duplicate original of the license issued by the Federal Power Commission to Henry Ford and Son, Incorporated, a corporation existing under the laws of the State of New York, on the third day of March, 1921, said duplicate original being in my custody as a part of the records of the Federal Power Commission.

[fol. 297] Witness my signature and the seal of the Federal Power Commission this twenty-ninth day of July, 1921.

O. C. Merrill, Executive Secretary.

The Federal Power Commission

Water-Power License, Project No. 13

Henry Ford and Son, Incorporated, New York

Whereas, by the Federal Water Power Act (hereinafter called the "Act"), approved June 10, 1920 (41 Stat., 1063), authority to issue licenses for the purpose of constructing, operating and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation, and for the development, transmission and utilization of power across, along, from, or in any of the navigable waters of the United States, or for the purpose of utilizing the surplus water or water power from any Government dam, is vested in the Federal Power Commission (hereinafter called the "Commission"); and

Whereas, Application has been made to the Commission in due and proper form by Henry Ford and Son, Incorporated, a corporation organized and existing under and by virtue of the laws of the State of New York, and having its office and principal place of business in the city of New York (hereinafter called the "Licensee"), for a license to construct, maintain and operate a hydroelectric power plant at the Government dam upon lands of the United States upon the west bank and in the channel of the Hudson River, in the vicinity of the cities of Green Island, Watervliet, [fol. 298] Troy, Albany and Cohoes, in the counties of Albany, Saratoga and Rensselaer, State of New York, and to use the surplus water or water power at said dam, the project being more fully described and located by certain maps, field notes, plans, specifications, estimates, and other data filed with and made a part of such application, and

Whereas, Notice of such application has been given and published by the Commission, as required by Section 4 of the Act; and,

Whereas, The plans for alterations in the dam and for other structures affecting navigation have been approved by the Chief of Engineers and the Secretary of War; and

Whereas, No application for said project has been filed by the State of New York or by any municipality thereof; and

Whereas, Satisfactory evidence has been presented to the Commission, as required by Section 9, subsection (6) of the Act, that the Licensee has complied with the laws of the State of New York and is legally entitled to proceed with the construction of said project when licensed by the Commission; and

Whereas, The Commission finds that the said project, including the maps, plans, and specifications, are best adapted to a comprehensive scheme of improvement and utilization of said stream for purposes of navigation, of water-power development, and of other beneficial uses; and that the contemplated improvement is desirable and justified in the public interest for the purpose of improving and developing the Hudson River for the use and benefit of interstate or foreign commerce;

Now, Therefore, The Commission hereby licenses the said Henry Ford and Son, Incorporated, to enter upon the [fol. 299] lands of the United States, adjoining and appurtenant to the west end of the Government dam at Troy, N. Y.; to occupy and utilize the said lands and the banks, shores, bed, and surplus water of said river; to construct on said lands and in said river at the location specified the works described in said application and by the maps, field notes, plans, specifications, estimates, and other data thereto attached; to make the alterations in the Government dam as specified; to dredge, excavate, and construct the additional channels in accordance with said plans; to divert the surplus waters of the said stream and to utilize the same and the water powers created by the said Government dam, in the amount and manner set forth in said application, and to maintain and operate said works in accordance with the proposals set forth in said application; subject, however, to the following conditions:

1. The terms and conditions of the Act, the rules and regulations of the Commission pursuant thereto, in force on the date of this license, and all other statutes pertaining to the subject matter, in so far as applicable, are hereby made a part of this license as though fully set out herein.

2. The said application, designated Project No. 13 in the records of the Commission, together with its maps, field notes, plans, specifications, estimates and other data, at-

tached thereto, marked Exhibits A to M, inclusive, are hereby made a part of this license; and the proposed works, alterations and improvements shall be constructed in accordance therewith. Except when emergency shall require for the protection of navigation, life, health, or property, no substantial alteration in or addition to the plans herein referred to shall be made to any dam or other project works constructed hereunder without the prior approval of the [fol. 300] Commission; and any emergency alteration or addition so made shall thereafter be subject to such modification and change as the Commission may direct.

3. Prior to beginning construction, the Licensee shall make and submit plans to provide for future electrical interconnection with adjacent power transmission systems; providing such interconnection is found by the Commission to be desirable.

4. The Licensee shall commence construction of the project works herein described within six months from the date of issuance of this license, and, subject to the provisions of the Act, shall complete the same within two years thereafter.

5. The work of construction under the license, whether carried on upon lands belonging to the United States or upon adjacent lands not so belonging, shall be subject to the supervision and approval of the District Engineer of the War Department in charge of the locality, who may temporarily suspend the work at any time if, in his judgment, navigation is being unreasonably impaired or if the approved plans are being departed from. The Licensee shall notify the said District Engineer at what time the work will be commenced, and as far in advance of the time of commencement as the said District Engineer may specify, and shall also notify him promptly, in writing, of the commencement of work, suspension of work, if for a period of more than one week, resumption of the work and its completion.

6. So far as any material is dredged or excavated in the prosecution of the work herein authorized, it shall be deposited to the satisfaction of the said District Engineer and in accordance with his prior permission or instructions.

[fol. 301] 7. The Licensee shall at all times be controlled by such reasonable rules and regulations in the interest of navigation, including the control of the level of pools, as may be made from time to time by the Secretary of War.

8. The tailrace channel forming part of the project works shall be maintained by the Licensee in the locality and of the dimensions required in the plans accompanying the application, and suitable bank protection must be provided and maintained in front of United States lands both above and below the dam, if and to the extent necessary to prevent the erosion of said lands.

9. If the display of lights and signals on any work hereby authorized is not otherwise provided by law, the Licensee shall install, maintain, and operate at its own expense such lights and signals as may from time to time be prescribed by the Secretary of War.

10. Except when prevented by flood or other cause beyond his control, the Licensee shall provide from this project and deliver at a suitable point in his power house such electric current, not exceeding 320,000 kilowatt hours per year, as may be necessary for power, light and other purposes for the operation, repair and upkeep of the United States lock at the Troy end of the dam; this current to be available at all times, and at a voltage to be agreed upon between the District Engineer and the Licensee. The Licensee shall furnish, install and maintain all necessary controlling and registering devices for the delivery of the current. If and when the interests of navigation require the construction of a second lock, the Licensee shall, upon the completion of the second lock, furnish, for the lighting and operation thereof, such additional current, not to exceed [fol. 302] a total for both locks of 600,000 kilowatt hours per year, as may be necessary.

11. The United States specifically safeguards the right to use water in such amounts as may be necessary in the interests of navigation.

12. The Licensee shall pay an annual charge, for the reimbursement of the United States for the cost of the administration of the Act, in accordance with Sections 1,

3 and 8 of Regulation 14 of rules and regulations of the Commission; and for the use of the aforesaid lands of the United States, of the dam adjacent thereto, and of the surplus waters impounded thereby, the Licensee shall pay an annual charge of Five Thousand ($5,000) Dollars in accordance with Sections 4, 6 and 8 of said Regulation 14. The charges for the use may, at the end of the first twenty years, and of every ten years thereafter during the period of the license, be readjusted by the Commission in accordance with the rule set forth in Section 4 of said Regulation 14.

13. After the first 20 years of operation of the project under this license, the Licensee shall establish and maintain amortization reserves out of the surplus earned thereafter, if any, accumulated in excess of a specified reasonable rate of return upon the actual legitimate investment of the Licensee in such project, as such investment is specified and determined under the Act and under the rules and regulations of the Commission with respect thereto, which excess surplus is designated for such purpose in said rules and regulations as "Surplus Earnings."

Such specified rate of return, for the purposes of this license, shall be one and one-half times the weighted average annual interest rate payable on the par value of the [fol. 303] long-term debt of the Licensee actually outstanding on account of project property and of non-project property operated in connection therewith at the beginning of the period of amortization and of each calendar year thereafter. The phrase "long-term debt" shall include the classes thereof defined or prescribed from time to time in the accounting rules and regulations of the Commission.

In determining such weighted average annual interest rate, there shall be included in the interest payable according to the terms of the bonds, notes or other evidence of such debt, discount (or premium) thereon and expenses incurred in connection with the issue and initial sale thereof, such discount (or premium) and expenses for such purposes being prorated with respect to any items of such debt over the life of the security issued in respect thereof in the manner prescribed in the accounting rules and regulations of the Commission.

The following proportions of such surplus earnings shall be paid into and held in such amortization reserves: Of all surplus earnings up to and including two per cent upon the actual legitimate investment, 30 per cent thereof shall be so paid; of all surplus earnings in excess of two per cent and not in excess of four per cent, 50 per cent thereof shall be so paid; of all surplus earnings in excess of four per cent and not in excess of six per cent, 70 per cent thereof shall be so paid; and of all such surplus earnings in excess of six per cent, 90 per cent thereof shall be so paid;

Provided: That the Commission, if it finds that the earnings of the Licensee during the first 20 years of operation have not yielded a fair return upon the actual, legitimate investment in the project of the Licensee, may limit the proportion of such surplus earnings to be paid into such [fol. 304] amortization reserves to 10 per cent until such time as the accumulated earnings of the Licensee represent in the judgment of the Commission a fair return upon such investment.

14. The Licensee agrees that if at any time it shall dispose of any power developed under this license to any customer, or any subsidiary corporation of the Licensee, the conditions of this license shall be brought to the attention of any such customer or corporation which may be engaged in public service as described in section 19 or 20 of the Act and that there shall be expressed in any written contract with such customer, before beginning service to it, the condition that such customer shall submit to the regulation, control, and orders of the Commission, as provided in said sections 19 or 20, whenever the Licensee is, or if in like service would be, subject to such regulation, control and orders; and shall further require any such contract to express the condition that the Commission may either with or without the joinder of the Licensee, enforce the said contract and the orders of the Commission by appropriate proceedings against such customer or corporation, as provided in sections 19, 20 and 26 of the Act. It is further agreed that such contract shall be upon condition, to be expressed therein, that it may be and shall be revoked by the Licensee

without incurring any liability in damages therefor if the Commission shall so direct because of the refusal of such customer or corporation to obey any order or to submit to regulation by the Commission in the cases provided for by said sections.

15. This license is for a term of fifty (50) years from its date of issuance, and is conditioned upon acceptance by the Licensee within thirty days of all the terms and conditions of the Act and of this license.

[fol. 305] 16. Upon the written consent of Licensee, the Commission may by order made under its seal, modify, alter, enlarge or omit in so far as authorized by law any one, or more, of the conditions or provisions of this license.

17. The enumeration herein of any rights reserved to the United States or to any State or municipality by the Federal Water Power Act, shall not be construed to the prejudice of any other rights so reserved by the said Act or by the regulations of the Commission.

In Witness Whereof, The Federal Power Commission has caused its name and seal to be hereto signed and affixed by O. C. Merrill, its Executive Secretary, this 3rd day of March, 1921.

Federal Power Commission, by O. C. Merrill, Executive Secretary.

This license is also executed by the Licensee this 29th day of March, 1921, in testimony of the acceptance by the Licensee of all the terms and conditions of the Federal Water Power Act of June 10, 1920, and of the further conditions imposed in this license; the name and corporate seal of the Licensee being hereto signed and affixed by Edsel B. Ford, its Vice-President, pursuant to the resolution of its Board of Directors, dated 29th day of March, 1921, the certified copy of the record thereof being hereto attached.

Henry Ford & Son, Inc., by Edsel B. Ford.

Attest: E. G. Liebold, W. J. Cameron.

[fol. 306] Extract of the Minutes of Meeting of the Board of Directors of Henry Ford & Son, a New York Corporation, Held at the Office of the Company, Highland Park, Michigan, at 4:00 p. m. March 29, 1921

"Upon motion duly made and seconded, the following resolution was adopted:

" 'Resolved, That Edsel B. Ford, the Vice-President of the corporation be and he is hereby authorized and empowered to execute in the name of the corporation and under its seal any and all contracts, obligations or engagements in any wise relating to the business of the corporation, and especially is he authorized to sign and execute, on behalf of the corporation, lease from the Federal Government of the surplus water power at the Troy Dam situated at Green Island, near Troy, New York.' "

I hereby certify that the foregoing is a correct extract from the minutes of a certain meeting of the Board of Directors of Henry Ford & Son, a New York corporation, at which meeting there was present a quorum of the said Board authorized to transact the business hereinbefore described; that the proceedings of the said meeting were in accordance with the charter and by-laws of the Company, and that the same have not been revoked, annulled nor amended in any manner whatsoever.

I further certify that I am custodian of certain records of said Company, including the minutes of the meetings of the Board of Directors.

[fol. 307] In witness whereof I have hereunto set my hand and affixed the corporate seal of the Company this 29th day of March, 1921.

E. G. Liebold, Assistant Secretary.

(Annexed is copy of Rules and Regulations of Federal Power Commission, being Orders No. 9, issued under Act of June 10, 1920, 41 Stat. 1063, effective from February 28, 1921.)

DEFENDANT'S EXHIBIT 11

U. S. Engineer Office, First District N. Y. C.
Jan. 9, 1925.

Regulations to Govern the Regulation of Pool Level and Maintenance of Flashboards at the Federal Dam, Troy, N. Y., under Water Power License No. 13, Granted to Henry Ford & Son, Inc.

The Law

The Federal Water Power Act of June 10, 1920, contains the following section:

"Sec. 18. That the operation of any navigation facilities which may be constructed as a part of or in connection with any dam or diversion structure built under the provisions of this Act, whether at the expense of a licensee hereunder or of the United States, shall at all times be controlled by such reasonable rules and regulations in the interest of [fol. 308] navigation, including the control of the level of the pool caused by such dam or diversion structure, as may be made from time to time by the Secretary of War. Such rules and regulations may include the maintenance and operation by such licensee at its own expense of such lights and signals as may be directed by the Secretary of War, and such fishways as may be prescribed by the Secretary of Commerce; and for willful failure to comply with any such rule or regulation such licensee shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished as provided in Section 25 hereof."

The Regulations

In pursuance of the foregoing law, the following regulations are prescribed to govern the pool level and maintenance of flashboards at the Federal Dam at Troy, N. Y.:

1. Whenever the elevation of the pool created by the Federal Dam at Troy, N. Y., shall fall to a point level with the crest of the main spillway, the elevation of which is +14.33 feet mean sea level, the operation of the power plant shall cease and further operation thereof shall be

suspended until such time as the water level rises to or above +14.43 mean sea level.

2. Flashboards may be maintained on the section of the spillway of the dam having an elevation of +14.33 feet mean sea level in order to increase the elevation of this section to an elevation equal to that of the auxiliary spillway, or +16.33 feet mean sea level, provided that the flashboards are so erected as to drop automatically when the pool level rises to an elevation of +18.5 feet mean sea level, and conform in other respects to the plans attached hereto.

[fol. 309] 3. The tide staff to be used in determining the elevation of the pool shall be the ceramic tide staff now located on the westerly face of the east lock wall north of the northerly gates, the zero of which is set two feet below mean sea level.

4. The regulation of the pool level and the maintenance of flashboards shall be subject to the supervision and approval of the District Engineer, First District, New York City.

5. These rules and regulations shall take effect and be in force on and after December 15, 1924.

Approved December 2, 1924.

(Signed) John W. Weeks, Secretary of War.

(Attached are same two blueprints as attached to Plaintiffs' Exhibit 17 showing location of Federal dam and flashboard details.)

In Supreme Court of New York

Stipulation Settling Case

Stipulated that the foregoing case, which contains all the evidence given and all of the proceedings taken upon the trial of the above-entitled action, may be settled and signed as above.

Dated August 22, 1927.

Thomas O'Connor, Attorney for Plaintiffs. Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

[fol. 310] IN SUPREME COURT OF NEW YORK

ORDER SETTLING CASE

The foregoing case, which is hereby certified to contain all of the evidence given and all of the proceedings taken upon the trial of the above-entitled action, is hereby settled and signed by me as above; and it is

Ordered, That the said case, as thus certified, settled and signed, be by the Clerk of the County of Saratoga filed in his office and annexed to the judgment roll in said action.

Dated August 31, 1927.

Christopher J. Heffernan, Justice Supreme Court.

IN SUPREME COURT OF NEW YORK, APPELLATE DIVISION, THIRD DEPARTMENT

[Title omitted]

STIPULATION WAIVING CERTIFICATION

Stipulated, pursuant to section 170 of the Civil Practice [fol. 311] Act, that the foregoing printed copies of Notice of Appeal from Judgment, Summons, Complaint, Answer, Decision, Defendant's Requests to Find, Defendant's Notice of Exceptions, Stipulation as to Damages, Judgment, Case and Exceptions, Notice of Appeal from Order, Notice of Motion and Order Granting Extra Allowance are true and correct copies of the whole of the respective originals thereof, now on file and of record in the office of the Clerk of Saratoga County, and of the Opinions of Mr. Justice Heffernan, and that certification thereof by said Clerk is hereby waived; also that, upon the argument of the appeal herein, either party may use the originals of all exhibits put in evidence.

Dated August 31, 1927.

Thomas O'Connor, Attorney for Respondents-Appellants. Whalen, Murphy, McNamee & Creble, Attorneys for Appellant-Respondent.

[fol. 312] In Supreme Court of New York, Appellate Division, Third Department

Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation, and Harry A. Furman, Charles H. Burrows, and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc., Respondents-Appellants,

against

Henry Ford & Son, Inc., Appellant-Respondent

Order Modifying Order Appealed From

The defendant above-named having appealed from the judgment entered in this action in the office of the Clerk of the County of Saratoga, June 10, 1927, in favor of the plaintiffs and against the defendant for an injunction and [fol. 313] damages, and said appeal having duly come on to be heard and having been duly heard at the March, 1928, Term of this Court, and after hearing Charles E. Nichols, Jr., of counsel for the defendant-appellant and George E. O'Connor, of counsel for the plaintiffs-respondent, and due deliberation having been had, and the court having decided that said judgment should be affirmed, Mr. Justice Hinman dissenting, and

The plaintiffs having appealed from so much of an order entered in this action in the office of the Clerk of the County of Saratoga, May 31, 1927, as denies to the plaintiffs any further amount over and above the sum of two hundred sixty dollars and fifty cents ($260.50), as an additional allowance under Section 1513 of the Civil Practice Act and the said appeal having duly come on for hearing and having been duly heard at the same time as the appeal hereinbefore mentioned and having been argued by the same counsel, and due deliberation having been had and the court having decided, Mr. Justice Hinman dissenting, that the said order and the judgment entered thereon should be modified so as to increase the extra allowance to the plaintiffs from two hundred sixty dollars and fifty cents ($260.50) to eleven hundred eighty-five dollars and fifty cents ($1,185.50).

Now, On motion of Thomas O'Connor, attorney for the plaintiffs-appellants and respondents, it is

Ordered, That the said order so appealed from by the plaintiffs be and the same hereby is modified by increasing the additional allowance granted to the plaintiffs from two hundred sixty dollars and fifty cents ($260.50) to eleven hundred eighty-five dollars and fifty cents ($1,185.50), and that the said judgment so appealed from be and the same [fol. 314] hereby is modified by increasing the plaintiff's recovery for costs, disbursements and additional allowances from three hundred sixty-four dollars and sixteen cents ($364.16) to twelve hundred eighty-nine dollars and sixteen cents ($1,289.16); that ten dollars ($10.00) costs and disbursements are awarded to the plaintiffs on their appeal from said order, and it is further

Ordered, That the said judgment, except as hereinbefore modified, be and the same hereby is affirmed with costs and disbursements to the plaintiffs-respondents on the appeal from said judgment by the defendant-appellant.

John S. Herrick, Clerk.

Entered May 24, 1928.

In Supreme Court of New York

Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation, and Harry A. Furman, Charles H. Burrows, and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc.

against

Henry Ford & Son, Inc.

Judgment of Appellate Division

The above-named plaintiffs having appealed from so much of an order, entered in this action in the office of the Clerk of the County of Saratoga, May 31st, 1927, as denied [fol. 315] to the said plaintiff any further amount over and above the sum of $260.50 as an additional allowance under Section 1513 of the Civil Practice Act, and the said

appeal having been argued and the said Appellate Division having by an order, made at a term of said court held May 15th, 1928, and entered in the office of the Clerk of the County of Saratoga on the 28th day of May, 1928, modified the said order and the judgment herein (which judgment was entered in the office of the Clerk of the County of Saratoga June 10th, 1927) so as to grant to the plaintiffs an extra allowance of $1,185.50, instead of $260.50, and increasing the plaintiffs' recovery for costs and disbursements from $364.16 to $1,289.16.

And the defendant having also taken an appeal to the Appellate Division of the Supreme Court from the said judgment, entered herein in favor of the plaintiffs and against the defendant, for an injunction and damages, and the said appeal having been argued and the Appellate Division of the Supreme Court having by the said order affirmed said judgment.

And the said Appellate Division having by the said order granted to the plaintiffs their costs and disbursements on each of said appeals

It is now on motion of Thos. O'Connor, attorney for said plaintiffs,

Ordered and Adjudged, that the said judgment in this action be and the same hereby is modified so as to increase the plaintiffs' recovery for costs and disbursements from three hundred sixty-four dollars and sixteen cents ($364.16) to twelve hundred eighty-nine dollars and sixteen cents ($1,289.16) so that said judgment, as modified, shall read as follows:

[fol. 316] "Ordered, adjudged and decreed

1. That the defendant be and it hereby is forever enjoined from maintaining flashboards on the crest of the dam in the Hudson river extending between the City of Troy, Rensselaer County and the Village of Green Island, Albany County, and from maintaining any other obstruction on said dam whereby the height thereof or the elevation of the water thereby impounded is or will be in any manner raised and from doing any other act or thing which will cause the raising of the elevation of the water upon the lands, buildings or water powers of the plaintiff.

2. That the plaintiffs Harry A. Furman, Charles H. Burrows and Clarence T. Wright, as Receivers of said Mohawk Paper Makers, Inc., recover of the defendant Henry Ford & Son, Inc., the sum of five thousand dollars ($5,000).

3. That the plaintiff Asbestos Spinning and Weaving Corporation recover of the defendant Henry Ford & Son, Inc., the sum of two hundred ten dollars ($210).

4. That the plaintiffs Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation and Harry A. Furman, Charles H. Burrows and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc., recover of defendant Henry Ford & Son, Inc., the sum of twelve hundred eighty-nine dollars and sixteen cents ($1,289.16) for costs, disbursements and additional allowance."

And it is further ordered and adjudged, That the judgment, as so modified be and the same hereby is affirmed and [fol. 317] that the plaintiffs Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation and Harry A. Furman, Charles H. Burrows and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc., recover of the defendant, Henry Ford & Son, Inc., the sum of two hundred sixty-two dollars and eighty-eight cents ($262.88) costs as taxed.

Judgment this 2nd day of June, 1928.

Charles J. Hennessy, Clerk.

IN SUPREME COURT OF NEW YORK

[Title omitted]

NOTICE OF APPEAL TO COURT OF APPEALS

SIRS: Please take notice that the above-named defendant Henry Ford & Son, Inc., hereby appeals to the Court of Appeals of the State of New York from the judgment of the Appellate Division of the Supreme Court, Third Department, entered in the above entitled action on June 2, 1928, in the office of the Clerk of the County of Saratoga, [fol. 318] upon an order of said Appellate Division made at a term thereof, commencing on May 15, 1928, whereof a

certified copy was entered in said Clerk's office on May 28, 1928, which judgment and order of said Appellate Division of the Supreme Court modified and, as so modified, affirmed with costs the judgment herein entered in said Clerk's office on June 10, 1927.

Dated June 13, 1928.

Yours, etc., Whalen, Murphy, McNamee & Creble, Attorneys for Defendant.

Office and Post Office address: 75 State Street, Albany, N. Y.

To Thos. O'Connor, attorney for plaintiffs, and clerk of the County of Saratoga.

[fol. 319] In Supreme Court of New York, Appellate Division, Third Department

Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation, and Harry A. Furman, Charles H. Burrows, and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc., Respondents-Appellants,

against

Henry Ford & Son, Inc., Appellant-Respondent

Opinion

Argued March Term, 1928. Decided May Term, 1928

Van Kirk, P. J.; Hinman, Davis, Whitmyer, Hill, A. JJ.

Appeal by defendant from a judgment entered in Saratoga County Clerk's office on June 10, 1927, adjudging plaintiffs to be entitled to an injunction and awarding damages. Cross appeal by plaintiffs from determination of trial court on question of additional allowance.

Thomas O'Connor, Attorney for Respondents-Appellants, Waterford, N. Y.

Whalen, Murphy, McNamee & Creble, Attorneys for Appellant-Respondent, Albany, N. Y.

[fol. 320] Hill, J.:

Each of the plaintiffs owns a manufacturing plant located on the northerly side of the fourth branch of the Mo-

hawk river. A short distance westerly there is a dam across this branch. The water so impounded flows through a canal to the plants, where fourteen feet of head is available for power. The tailrace returns the water to the same stream from which it was taken. The dam and canal, together with the plants as they are presently used "have been owned, possessed, used, occupied, operated and maintained by their predecessors in title continuously since in or about the year 1828." About 1915, the United States government constructed the Federal dam, across the Hudson river, nearly three miles below the plaintiffs' plants. It was constructed pursuant to an Act of Congress, approved June 24, 1910 (36 Stat., Chap. 382), and was in furtherance of the unquestioned federal right to regulate interstate and foreign commerce. It is a wing dam. The crest of the westerly section is 17.2 feet above a bench mark known as the Barge Canal Datum (B. C. D.). The easterly section of the dam is 15.2 feet above B. C. D. This section was so constructed as to permit the installation of flash boards. Defendants had erected a plant upon Green Island, adjacent to the river, and a power station south of the dam. On or about June 16, 1925, they installed flash boards two feet in width on the easterly section of the dam. The resultant rise adjacent to plaintiffs' structures nearly covered the tailrace at each plant, and reduced the head to 12 feet. Defendants claimed to act under a license or permit from the proper authorities of the Federal Government, under the Federal Water Power Act, June 10, 1920. [fol. 321] (Chap. 285, 41 Stat., 1063.) The correspondence between defendants and the War Department plainly shows that these boards were installed "in connection with the operation of" defendants' power house. The trial court so found, and further "that there is no necessity for the use of these flash boards for navigation purposes, because the government dam was designed to be sufficient under normal conditions for navigation purposes without flash boards." The findings were justified by the evidence. The government had constructed the dam to aid navigation and had not installed the boards. The purposes of navigation, evidently, had been properly and adequately served, in the opinion of the government, without their installation. They were installed only when defendants' private purpose

would be aided. This was stated when application was made to the government, and permission was granted for that purpose. Any benefits to navigation attempted to be proved were trivial and unimportant.

The position of the defendant is that the authorization by the government leaves no question for judicial review. They cite United States v. Chandler-Dunbar Co. (229 U. S., 53), as authority sustaining their position that when the Federal Water Power Commission authorized the erection of these boards, it was an act in aid of navigation, and not subject to judicial review. I do not so understand that authority. It deals with the property rights which may be privately held in lands under navigable waters, and the right of Congress in the interest of navigation, to use such lands and control the flowage of the streams. The determination by Congress, or by a body authorized and empowered by Congress, that a use is a public use is final, but [fol. 322] "the nature of the use whether public or private is ultimately a judicial question." Rindge Co. v. Los Angeles County (262 U. S. 700, 705). Taking the private property of one person without his consent for the private use of another is a violation of the Federal Constitution. Missouri Pacific Railway Co. v. Nebraska (164 U. S. #403). Hairston v. Danville & Western Railway (208# id. 598). To reiterate, the necessity or expediency of taking property for public use is a legislative and not a judicial question, but the nature of the use of the property so taken or to be taken, whether public or private, is a judicial question.

It is stipulated in the case that plaintiffs own the Kings dam and canal and the water power thereby made available. A portion of plaintiffs' property has been taken, by placing the flash boards and the resulting rise of water in the pool. This was not a taking of lands under navigable waters, in regard to which Congress and the federal authorities have complete and entire control. United States v. Cress (243 U. S. 316). In that case, as to claim No. 718, the identical condition existed as here. Federal locks and dams were constructed in the Cumberland and Kentucky rivers. The claimants owned five and one-half acres of land upon which there was a mill adjacent to a tributary of the Kentucky river.

The opinion says:

"That by reason of the erection of the lock and dam the mill no longer can be driven by water power; that the water above the lock and dam when it is at pool stage is about one foot below the crest of the mill dam, and this prevents the drop in the current that is necessary to run the mill; that [fol. 323] no part of the land or mill is overflowed or covered by pool stage of water nor is the mill physically damaged thereby."

The opinion states in determination of the claim:

"The right to have the water flow away from the mill dam undisturbed except as in the course of nature, is not a mere easement or appurtenance, but exists by the law of nature as an inseparable part of the land. A destruction of this right is a taking of a part of the land."

The tributary upon which this mill was located was non-navigbble water, but that in no wise changes the situation in this case, for it is conceded here that there is private ownership of the King dam, canal and water power, and there has been no claim by the Federal Government that its removal will be necessary to improve navigation.

Pumpelly v. Green Bay Co. (80 U. S., 166); Monongahela Navigation Co. v. United States (148 id., 318); American Woolen Co. v. State (195 App. Div., 698), each support plaintiffs' right to damages and an injunction upon the theory hereinbefore discussed.

Defendant is a licensee, section 10, subdivision C of the Federal Water Power Act (supra) provides in part:

"Each licensee hereunder shall be liable for all damages occasioned to the property of others by the construction, maintenance or operation of the project works * * *."

The force of such a statute has been recognized in this State. (Oswego & Syracuse R. R. Co. v. State, 226 N. Y., 351; Fulton L. H. & P. Co. v. New York, 200 id., 400.) But, to make that applicable there must have been a "tak-[fol. 324] ing" in aid of commerce. In this case there is an attempt to take property for private use, to prevent which an injunction is asked, and the damages are only those that accrued prior to the restraining order.

The nature of the use of plaintiffs' property which would be taken if flashboards are maintained, was properly determined to be for the private benefit of the defendant, and the court had power to make that determination. Plaintiffs are entitled to a permanent injunction, restraining this illegal taking, and for the damages which they suffered during the period their rights were invaded.

On the question of costs. Williamsburg City Fire Insurance Co. v. Central New England Railroad Co. (202 App. Div., 813, affirmed 235 N. Y., 582) seems to decide that the 5 per cent extra allowance must be computed upon the amount of the recovery, but I feel that the plaintiffs are entitled to as substantial an allowance as the statute will permit. They advocate a somewhat ingenious theory that giving due regard to the above decision, 5 per cent may be allowed on the value of the subject matter in connection with the Little Falls Fibre Company cause of action, because they received no award for damages. The second subdivision of section 1513 permits 5 per cent extra allowance "upon the sum recovered or claimed, or the value of the subject matter involved." The Fibre Company did not recover or claim any sum. The value of the subject matter involved belonging to them was $18,500. Plaintiff's allowance should be increased by 5 per cent of such sum. The judgment as so modified should be affirmed.

[fol. 325] In Court of Appeals of New York

Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation, and Harry A. Furman, Charles H. Burrows, and Clarence T. Wright, as Receivers of Mohawk Paper Makers, Inc., Respondents,

against

Henry Ford & Son, Inc., Appellant

Stipulation Waiving Certification

It is hereby stipulated, pursuant to section 170 of the Civil Practice Act, that the foregoing printed copies of notice of appeal to the Appellate Division, judgment roll,

case and exceptions, opinion in the Appellate Division, order of Appellate Division, judgment of Appellate Division entered thereon and notice of appeal to the Court of Appeals are correct copies of the whole of the respective originals thereof, now on file and of record in the office of the Clerk of the County of Saratoga, and that certification of said copies by said clerk is hereby waived; also that upon the argument of the appeal to the Court of Appeals herein, either party may use the originals of all exhibits in evidence.

Dated June 28, 1928.

Thomas O'Connor, Attorney for Respondents.
Whalen, Murphy, McNamee & Creble, Attorneys for Appellant.

REMITTITUR

COURT OF APPEALS

STATE OF NEW YORK, ss:

Pleas in the Court of Appeals, held at Court of Appeals Hall, in the City of Albany, on the 31st day of December, in the year of our Lord one thousand nine hundred and twenty-eight, before the Judges of said Court.

Witness the Hon. Benjamin N. Cardozo, Chief Judge, presiding.

Wm. J. Armstrong, Clerk.

Remittitur December 31, 1928.

LITTLE FALLS FIBRE COMPANY & O'RS, Respondents,

ag'st

HENRY FORD & SON, INC., Appellant

Be it remembered that on the 3rd day of July in the year of our Lord one thousand nine hundred and twenty-eight, Henry Ford & Son, Inc., the appellant in this cause, came here unto the Court of Appeals, by Whalen, Murphy, McNamee & Creble, its attorneys, and filed in the said Court a Notice of Appeal and return thereto from the judgment of the Appellate Division of the Supreme Court in and for the Third Judicial Department. And Little Falls Fibre Company and others, the respondents in said cause, afterwards appeared in said Court of Appeals by Thomas O'Connor, their attorney.

Which said Notice of Appeal and the return thereto, filed as aforesaid, are hereunto annexed.

Whereupon the said Court of Appeals having heard this cause argued by Mr. Charles E. Nichols, Jr., of counsel for the appellant, and by Mr. George E. O'Connor, of counsel for the respondents, and after due deliberation had thereon, did order and adjudge that the judgment of the Appellate Division of the Supreme Court appealed from herein be and the same hereby is affirmed with costs.

And it was also further ordered, that the record aforesaid, and the proceedings in this Court, be remitted to the said Supreme Court there to be proceeded upon according to law.

Therefore it is considered that the said judgment be affirmed with costs as aforesaid.

And hereupon, as well the Notice of Appeal and return thereto aforesaid as the judgment of the Court of Appeals aforesaid, by it given in the premises, are by the said Court of Appeals remitted into the Supreme Court of the State of New York before the Justices thereof, according to the form of the statute in such case made and provided, to be enforced according to law, and which record now remains in the said Supreme Court, before the Justices thereof, &c.

Wm. J. Armstrong, Clerk of the Court of Appeals of the State of New York.

COURT OF APPEALS

Clerk's Office, Albany

December 31, 1928.

I hereby certify that the preceding record contains a correct transcript of the proceedings in said cause in the Court of Appeals, with the papers originally filed therein, attached thereto.

Wm. J. Armstrong, Clerk. (Seal.)

To Whalen, Murphy, McNamee & Creble, Attorneys for Defendant, 75 State Street, Albany, N. Y.:

You will please take notice of the Remittitur from the Court of Appeals in the above entitled action filed in the Clerk's office of the County of Saratoga on the 18th day of January, 1929, with a copy of which you are herewith served.

Dated January 19, 1929.

Thos. O'Connor, Attorney for Plaintiffs. Office & Post Office address: Waterford, Saratoga County, N. Y.

1—Add

At a Special Term of the Supreme Court held at the Court House in the City of Troy on the 17th day of January, 1929.

Present: Hon. Pierce H. Russell, Justice.

SUPREME COURT, SARATOGA COUNTY

LITTLE FALLS FIBRE COMPANY, ASBESTOS SPINNING & WEAVING Corporation, and Charles H. Burrows, C. T. Wright, and Harry A. Furman, as Receivers of Mohawk Paper Makers, Inc., Plaintiffs,

against

HENRY FORD & SON, INC., Defendant

ORDER

The above named defendant having appealed to the Court of Appeals of the State of New York from the judgment of the Appellate Division of the Supreme Court, Third Department, entered in the above entitled action on June 2, 1928, in the office of the Clerk of the County of Saratoga, which judgment modified and, as so modified, affirmed with costs the judgment herein entered in said Clerk's office on June 10, 1927, and the said appeal having been duly argued in the Court of Appeals and after due deliberation the Court of Appeals having ordered and adjudged that the said judgment so appealed from as aforesaid be affirmed with costs, and having further ordered and adjudged that the proceedings therein be remitted to the Supreme Court there to be proceeded upon according to the law,

Now on reading and filing the remittitur from the Court of Appeals herein and

On motion of Thomas O'Connor, attorney for the plaintiffs, it is

Ordered

That the said order and judgment of the Court of Appeals be and the same hereby are made the order and judgment of this Court.

Enter in Saratoga County.

Pierce H. Russell, Justice Supreme Court.

Entered Jan. 18, 1929, 3:57 p. m. Charles J. Hennessy, Clerk.

SUPREME COURT, SARATOGA COUNTY

LITTLE FALLS FIBRE COMPANY, ASBESTOS SPINNING & WEAVING CORPORATION, and CHARLES H. BURROWS, C. T. WRIGHT, and HARRY A. FURMAN, as Receivers of Mohawk Paper Makers, Inc., Plaintiffs,

against

HENRY FORD & SON, INC., Defendant

JUDGMENT

A judgment in this action in favor of the plaintiffs and against the defendant having been rendered in this Court June 10, 1927 enjoining the defendant from maintaining flashboards on the crest of the dam in the Hudson river extending between the City of Troy, Rensselaer County, and the Village of Green Island, Albany County, and from maintaining any other obstruction on said dam whereby the height thereof or the elevation of the water thereby impounded might in any manner be raised, and from doing any other act or thing which might cause the raising of the elevation of the water upon the lands, buildings, or water powers of the plaintiffs, and awarding to the plaintiffs, against the defendant, damages in the sum of Five Thousand Two Hundred Ten Dollars ($5,210.00) and costs in the sum of Three Hundred Sixty-four Dollars and Sixteen Cents ($364.16), and the defendant having appealed to the Appellate Division of this Court, Third Department, from said judgment and the whole thereof, and the plaintiffs having appealed from so much of an order entered in this action in the office of the Clerk of the County of Saratoga May 31, 1927 as denied to the plaintiffs any further amount over and above the sum of Two Hundred Sixty Dollars and Fifty Cents ($260.50) as an additional allowance, and the said Appellate Division upon said appeals having rendered judgment under date of June 2, 1928 modifying the said judgment so as to increase the extra allowance of the plaintiffs by the sum of Nine Hundred Twenty-five Dollars ($925.00) and having affirmed said judgment as so modified, and the defendant having appealed from said judgment of the Appellate Division to

the Court of Appeals, and the Court of Appeals having sent hither its remittitur filed herein on the 18th day of January, 1929 by which it appears that the said Court of Appeals has affirmed the said judgment in all things with costs and has given judgment accordingly, and has remitted the judgment of said Court of Appeals to this Court to be enforced according to law, and this Court having by an order duly entered herein on the 18th day of January, 1929 ordered that the said judgment be made the judgment of this Court, and the plaintiffs' costs having been duly taxed at the sum of Two Hundred Forty-four Dollars ($244.00), it is

Now, on motion of Thomas O'Connor, attorney for plaintiffs,

Adjudged

That the said order and judgment of the Court of Appeals be and the same hereby are made the order and judgment of this Court, and it is further

Adjudged

That the said judgment of the Appellate Division be and the same hereby is in all things affirmed with costs and that the plaintiffs recover of the defendant the sum of Two Hundred Forty-Four Dollars ($244.00) costs as taxed and have execution therefor.

Charles J. Hennessy, Clerk.

Entered Jan. 18, 1929, 3:57 p. m.

LITTLE FALLS FIBRE COMPANY et al., Respondents,

v.

HENRY FORD & SON, INC., Appellant

(Decided December 31, 1928)

Appeal by Defendant from Judgment of Appellate Division, Third Department, Modifying, and as Modified Affirming, a Judgment of Special Term in Favor of Plaintiffs

Charles E. Nichols, Jr., for appellant.
George E. O'Connor for respondents.

POUND, J.:

The Federal Water Power Act (June 10, 1920, ch. 285; 41 Stat. 1063; U. S. Code, title 16, § 797, subd. d) created the Federal Power Commission which is empowered, with limitations not applicable to this case, "To issue licenses to citizens of the United States, or to any association of such citizens, or to any corporation organized under the laws of the United States or any State thereof, or to any State, or municipality for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation, and for the development, transmission, and utilization of power across, along, from or in any of the navigable waters of the United States, or upon any part of the public lands and reservations of the United States (including the Territories), or for the purpose of utilizing the surplus water or water power from any Government dam, except as herein provided."

The defendant applied to the Federal Water Power Commission for permission "to install flashboards on the Troy Dam in connection with our power house." The Troy Dam is a Federal wing dam in the Hudson river at Troy constructed to regulate navigation under an act of Congress. Defendant has a power house at Green Island using power developed at the dam. It desired to raise the level of the dam in order to develop more power. The Commission thereupon issued to it a water power license. The terms of the license are unnecessarily broad and are operative practically, so far as this litigation is concerned, only as applied to the maintenance of the flashboards. The flashboards were erected by defendant with the result that the water from down stream backed up so as to reduce the head at plaintiffs' manufacturing plants up stream. Plaintiffs are riparian owners who claim to be entitled to the flow of the stream as against this defendant, unobstructed by the flashboards. (Clinton v. Myers, 46 N. Y. 511, 516; U. S. v. Rio Grande Dam & Irrigation Co., 174 U. S. 690, 702.) Their rights must yield to the power of Congress to regulate commerce (U. S. Const. art. 1, § 8, clause 3), but

not to individuals. (Sage v. Mayor, 154 N. Y. 61.) They brought this action for an injunction and damages. They have succeeded in obtaining a judgment enjoining the defendant from maintaining the flashboards and awarding damages. The question is whether they must submit to the authority of the Federal Water Power Commission as asserted by the defendant under its license.

The construction of dams in the Hudson river without the consent of the Federal government is prohibited.

"It shall not be lawful to construct or commence the construction of any bridge, dam, dike, or causeway over or in any port, roadstead, haven, harbor, canal, navigable river, or other navigable water of the United States until the consent of Congress to the building of such structures shall have been obtained and until the plans for the same shall have been submitted to and approved by the Chief of Engineers and by the Secretary of War: Provided, That such structures may be built under authority of the Legislature of a State across rivers and other waterways the navigable portions of which lie wholly within the limits of a single State, provided the location and plans thereof are submitted to and approved by the Chief of Engineers and by the Secretary of War before construction is commenced." (U. S. Code, title 33, § 401.)

Since the enactment of chapter 425, Acts of Congress, 1899, "the creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is * * * prohibited," even though the waterway is within the limits of a single State. (U. S. Code, title 33, § 403; U. S. v. Rio Grande Dam & Irrigation Co., supra, pp. 708, 709; Economy Light Co. v. U. S., 256 U. S. 113, 123.) It has been held that these sections do not imply that the "affirmative authorization" of the building of a dam under such a permit is given by Congress with the same effect as though Congress had undertaken the enterprise itself. They merely place a condition upon the exercise of such right. The right to construct the dam must be established independently of the Federal permit. (International Bridge Co. v. New York, 254 U. S. 126, 132.)

The sections above quoted are negative. The provisions of the Federal Water Power Act are affirmative. They

purport to permit and regulate the granting of licenses for power purposes. Defendant claims to have obtained from the Commission more than a permit to place an obstruction in a navigable stream; more than a permit which purports to give the defendant no right to build the structure and merely sanctions the exercise of rights obtained elsewhere. The Commission has made a finding, without taking evidence to support it, in substance in the language of the Water Power Act (U. S. Code, title 16 § 797, subd. d) "that the contemplated improvement is desirable and justified in the public interest for the purpose of improving and developing the Hudson River for the use and benefit of interstate commerce." It has also made regulations pursuant to Federal Water Power Act, section 18 (U. S. Code, title 16, #811) to govern the maintenance of the flashboards "in the interests of navigation."

Although the act provides (§ 10-c; U. S. Code, title 16, §803, subd. c): "Each licensee hereunder shall be liable for all damages occasioned to the property of others by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto, constructed under the license, and in no event shall the United States be liable therefor," defendant contends that this section is inapplicable; that plaintiffs have suffered no damages because there has been no taking of private property but merely a regulation of the flow of the river by the Federal government in aid of navigation, for which the plaintiffs could have no compensation against the United States and, therefore, none against its licensee. Private property may not be taken for public use without compensation (U. S. v. Cress, 243 U. S. 316), but the flow of the stream of a navigable river is in no sense private property and there is no room for judicial review, at the instance of the private owner of the banks of a stream whose lands are not flooded, of a determination of Congress that such flow is needed for the purposes of navigation. (U. S. v. Chandler-Dunbar Water Power Co., 229 U. S. 53; New Jersey v. Sargent, 269 U. S. 328, 337.) Defendant asserts that its license is the equivalent of such a determination of Congress and is not subject to judicial review.

The first question is as to the effect of a Federal permit to place an obstruction in a navigable stream for the private business purposes of the licensee upon the rights of up-stream owners to the free flow of the stream.

The jurisdiction of the Federal Power Commission to issue a license for the use of the waters of the Hudson river for power purposes and the effect of such a license are to be determined by the courts. When some right asserted under a license becomes the subject of actual controversy, excess of jurisdiction is a necessary ground for judicial review to maintain the supremacy of law and keep administrative boards to the exercise of their delegated powers. (Matter of Quinby v. Public Service Commission, 223 N. Y. 244; New Jersey v. Sargent, supra, p. 339.) The finding of the Commission that the project work is in aid of navigation is not conclusive on the courts in the absence of evidence to support it, even though the license is in form within the delegated powers of the Federal Water Power Commission. (People ex rel. N. Y. & Queens Gas Co. v. McCall, 245 U. S. 345, 348.)

. It may be assumed, although we do not attempt to decide, that Congress may, in connection with its limited enumerated express or implied powers, provide for the development of water power in aid of or as incidental to such powers (U. S. Const. art. 1 § 8, clause 18); and that it may not, within the scope of the Constitution, go into the business of power development as an independent proposition. The extent of the authority of Congress to enact laws to carry into execution its enumerated powers need not be considered at this time. Doubtless it is very broad. (M'Culloch v. Maryland, 4 Wheaton (U. S.) 316; Legal Tender Case, 110 U. S. 421; New Jersey v. Sargent, supra.) How far Congress may delegate its powers to regulate navigation in this connection remains an open question. We will assume, although we do not so decide, that the Federal Water Power Act, properly construed, is a constitutional exercise of legislative power (New Jersey v. Sargent, supra.) The license granted to defendant herein does not result in any development and improvement of navigation. Its plain effect is the removal of the prohibition of Congress against the placing of an obstruction in a navigable sream; nothing more is accomplished.

The evidence on the trial clearly establishes the fact that the flashboards are neither authorized by the Commission nor maintained by defendant except for the private purposes of defendant in developing power and that their erection has no relation to "the interests of navigation" except that they must not interfere with navigation. The license, so far as it purports to delegate to defendant the powers of Congress to regulate navigation, is an extra-jurisdictional act of an administrative board, affording no protection to defendant as against the rights of others.

In conclusion, we have no reason to assume that the Federal Water Power Commission intended by its license to exempt the holder from liability for damages to the rights of others or to legalize what would otherwise be a trespass as to them. Defendant, we think, places more reliance on the form than on the substance of its permit. Congress did not authorize the grant of water power licenses which might be utilized to the detriment of existing power rights without compensation. (Head v. Amoskeag Mfg. Co., 113 U. S. 9, 26; U. S. Code, title 16, § 814.)

A question of costs remains. We are of the opinion that the additional allowance based on "the value of the subject matter involved" was proper (Civ. Prac. Act, § 1513, subd. 2), the subject-matter involved being the plaintiffs' right to use the water of the river without interference and one of the plaintiffs having suffered no damage on which the additional allowance could be computed.

The judgment should be affirmed, with costs.

CRANE, J. (concurring):

The permission given by the Federal Power Commission to install flashboards on the Troy Dam was nothing more or less than permission. It meant that so far as the United States government was concerned, it had no objection to the applicant making this use of the dam. In the same way, it might have given permission to an individual to walk over it. If he did any damage in walking over it, or any damage in putting up the flashboards, that was his own lookout, for which he would have to pay. The applicant was not obliged to put up any flashboards for any pur-

poses of the United States government; it was solely his own affair; he could do it or not just as he pleased. The Commission merely said: "We have no objection." I do not see how the power of the Commission is involved in this litigation.

CARDOZO, Ch. J. (concurring in result):

The license by the Commission, whether within the jurisdiction of that body or without it (cf. People ex rel. Lehigh Valley Ry. Co. v. State Tax Comm., 247 N. Y. 9, 15), did not exempt the holder from liability for damage caused to others by a diversion of the waters, nor authorize the impairment without requital of existing rights of property (U. S. Code, title 16, § 803, subd. c; § 814; Otis Co. v. Ludlow Mfg. Co., 201 U. S. 140, 152; Kaukauna Co. v. Green Bay Canal Co., 142 U. S. 254, 276; Head v. Amoskeag Mfg. Co., 113 U. S. 9, 23, 26).

Until such rights have been condemned by appropriate proceedings (U. S. Code, title 16, § 814; cf. N. Y. Condemnation Law (Consol. Laws, ch. 73), §§ 17, 24; Sweet v. Rechel, 159 U. S. 380, 401; Crozier v. Krupp, 224 U. S. 290), the defendant is still a trespasser in obstructing the flow of the stream to the damage of a neighbor.

Whether the power of eminent domain may lawfully be exercised under section 814 of the statute by one so situated as the defendant is a question not before us.

The judgment should be affirmed, with costs.

ANDREWS, J. (concurring in result):

Before 1789 the bed of the Hudson river was the property of the State of New York. It also exercised governmental control over its waters. A navigable stream, whatever property and powers the State had were held in trust for the people of New York and were subject to their right to use the river for their own navigation and commerce. (Matter of Mayor, 182 N. Y. 361; People ex rel. Palmer v. Travis, 223 N. Y. 150). The State might regulate its flow by dams or other means. It might improve its bed. It might remove obstructions. It might to a reasonable extent divert its waters into canals. It might exercise all the powers possessed by the King and Parliament before the Revolution.

A riparian proprietor also had certain rights. He was entitled to access of the stream. He might erect docks not interfering with navigation. (Town of Brookhaven v. Smith, 188 N. Y. 74.) He might divert reasonably its flow and lead it over his own land so creating water power. And he might do this as well where the level of the river was raised by a State dam as where the river passed his property in its natural condition if only such surplus was taken as was not needed for State purposes. (United Paper Board Company v. Iroquois Pulp & Paper Company, 249 N. Y. —.) Except to improve navigation the State would have no right to deprive him of the use of the amount of water which naturally ran past his premises.

Some things, however, were not permitted. Without consent he might not enter upon State lands and erect structures thereon. He might not build a dam or other obstruction to the flow of the river. If he did he created a purpresture, or, if it also interfered with navigation, a public nuisance. (People v. Vanderbilt, 26 N. Y. 287; Ice Company v. Schultz, 116 N. Y. 382.) In either case it might be abated and removed at the suit of the Attorney-General. If a public nuisance a remedy might also be had in an action by any one shown to be especially injured thereby. So I think, if a purpresture, under our form of government, title being in the people, any one especially injured by the invasion of their rights should have a remedy as in the case of a nuisance.

All these rights and powers remain unchanged except in so far as we have chosen to surrender them to the government of the United States. We did agree that Congress should have power to regulate commerce with foreign nations and among the several States. Just how far we believed we surrendered our authority over the Hudson by this clause is far from clear. Singularly little appears in the debates of the Convention, in the debates here when the Constitution was ratified or in the Federalist on the subject, although the need for the creation of a central authority to regulate commerce was one of the moving causes for the adoption of the Constitution. (Brown v. Maryland, 12 Wheat. 419.)

Whatever may have been understood at the time we are admonished that the words used are to be given a broad

significance. (Gilman v. Philadelphia, 3 Wall. (U. S.) 713; Gibson v. United States, 166 U. S. 269; United States v. Chandler-Dunbar Water Power Co., 229 U. S. 53; New Jersey v. Sargent, 269 U. S. 328.) They confer the power not only to regulate shipping itself but to regulate the stream. Congress may deepen the river; turn one channel into another; remove obstructions; build dams to regulate the flow of the water; forbid, without its consent, the erection of structures that do or may interfere with navigation, and may doubtless do many other things. But there is a limit to its power. Whatever it does must be "to regulate commerce with foreign nations and among the several states." It has no rights in the Hudson not connected with navigation. (Groat v. Moak, 94 N. Y. 115; People v. International Bridge Company, 223 N. Y. 137, 145.) And it is for the courts to determine whether this limit has been exceeded. They must decide ultimately whether congressional regulation has any relation to commerce. (Chief Justice Fuller in Lottery Cases, 188 U. S. 321.) If it has not, there is no basis upon which it may rest.

Undoubtedly Congress may determine for itself what is an obstruction to a navigable stream and its determination is conclusive. It may forbid the erection of bridges or dams or it may, so far as it is concerned, permit them with the consent of some official. It does these things in connection with its power over commerce. It has no power, however, to give an individual plenary authority to erect a dam for power purposes across the Hudson. Its permit merely waives an objection to such a work that the United States might otherwise make. Any one relying on that permit alone commits a trespass upon the lands of the State. He invades its property. As has been said, it is a purpresture subject to abatement. And as I have before indicated, I think any one especially injured has a remedy.

The act we have before us is a general one as is pointed out by the chief judge subjecting all dams and similar buildings to Federal license and supervision. So much may be done. Their erection and maintenance directly affect the flow of a navigable river. They cannot be built without Federal consent. (People ex rel. Lehigh V. Ry. Co. v. Tax Commission, 247 N. Y. 9). But this consent is not

enough unless it is given in aid of navigation. It removes but one obstacle in the way of the lawful maintenance of the dam.

Taken at its face value the act does more than refer to navigation. It permits dams for the development of water power. This Congress has no power to do. At most it may give its consent if the dam is otherwise permitted. Under that consent alone the defendant has no authority to do what it has done.

For on its face the permission shows it was given with no reference to commerce. Clearly it was simply to allow the defendant to develop water power for manufacturing purposes. Acting under it alone the defendant has violated the rights of the State and has also injured the plaintiffs.

It seems to me immaterial whether we construe the statute with an "or" or an "and." If with "or" it is plainly a usurpation of power nowhere conferred. If with "and," I think it equally unauthorized. I do not think the United States may traffic in excess power, created by a dam legally created for purposes of commerce. What is said in the Chandler-Dunbar case is plainly a dictum. But whether this be so or not we need not decide. Here, as has been said, there is no attempt to sell such excess power. New power is attempted to be created for purely private purposes.

Crane, J., in memorandum, Lehman, Kellogg and O'Brien, J. J., concur with Pound, J.; Cardozo, Ch. J., and Andrews, J., in opinions concur in result.

Judgment affirmed, etc.

CERTIFICATION OF TRANSCRIPT

STATE OF NEW YORK, ss:

Office of the Clerk of the County of Saratoga

I, Charles J. Hennessy, Clerk of the said County of Saratoga and also Clerk of the Supreme and County Courts, being courts of record held therein, do hereby certify that

272

I have compared the annexed copy of remittitur from the Court of Appeals of the State of New York and the record on appeal, order and judgment with the originals thereof, filed in this office on the 18th day of January, 1929, and that the same is a correct transcript therefrom and of the whole of said originals, and I further certify that I have compared the annexed copy of the opinions of the Court of Appeals in said case with the originals thereof, now on file in this office, and that the same is a correct copy thereof and of the whole of said original opinions.

In testimony whereof, I have hereunto set my hand and affixed my seal of office this 5th day of February, 1929.

Charles J. Hennessy, Clerk. (Saratoga County Seal, 1866.)

[fol. 347] SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed April 15, 1929

The petition herein for a writ of certiorari to the Supreme Court of the State of New York is granted. And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

Endorsed on cover: File No. 34,061. New York Supreme Court. Term No. 752. Henry Ford & Son, Inc., petitioner, vs. Little Falls Fibre Company, Asbestos Spinning and Weaving Corporation, and Harry A. Furman, et al., etc. Petition for writ of certiorari and exhibit thereto. Filed March 7th, 1929. File No. 34,061.